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PAPERS

IN

AGRICULTURE.

AGRICULTURE.

THE Thanks of the Society were given to WILLIAM PATTENSON, of Ibornden, in Biddenden, Kent, Eſq. for the following Communication relative to the preſerving young Plantations of Trees from the Injuries occaſioned by Hares, Rabbits, &c. Should any Perſons make trial of the method here propoſed, an account of the effect will be highly acceptable to the Society.

SIR,

I BEG you will be ſo kind as to make my moſt reſpectful acknowledgements to the Society, for their civility in favouring me with the tenth volume of their Tranſactions;

actions; and if the following method of preſerving young Plantations from being injured by Hares or Rabbits, ſhould be acceptable, I ſhall be happy in having communicated it; and am,

Sir,

With great reſpect,

Your moſt obedient ſervant,

Wm. Pattenson.

Ibornden,
Oct. 6, 1792.

A Method to prevent Hares and Rabbits barking young Plantations.

HARES, rabbits, and rats, have a natural antipathy to tar; but tar, though fluid, contracts, when expoſed to the ſun and air for a time, a great dryneſs, and a very binding quality; and, if applied to trees in its natural ſtate, will occaſion them to be bark-bound. To remove this difficulty,

culty, tar is of ſo ſtrong a ſavour, that a ſmall quantity, mixed with other things in their nature open and looſe, will give the whole mixture ſuch a degree of its own taſte and ſmell as will prevent hares, &c. touching what it is applied to.

Take any quantity of tar, and ſix or ſeven times as much greaſe, ſtirring and mixing them well together; with this compoſition bruſh the ſtems of young trees, as high as hares, &c. can reach; and it will effectually prevent their being barked. I believe, if a plantation of aſh (which they are very fond of) were made in a rabbit-warren, this mixture would certainly preſerve it.

They do great miſchief amongſt flowering ſhrubs, are particularly fond of Spaniſh broom, ſcorpion-ſenna, and ever-green cytiſus. I have had thoſe ſhrubs eat down to a ſtump; but, as the mixture cannot be conveniently applied to them, I have encloſed their branches with new tar twine by putting it ſeveral times round the ſhrub, which has had the deſired effect; tar twine, by being expoſed to the air and rain, will loſe its ſmell; conſequently, muſt be renewed as occaſion requires; but the mixture is always to be preferred, where it can be uſed.

The SILVER MEDAL and THANKS of the Society were voted to THOMAS SKIP DYOT BUCKNALL, Eſq. for the following Obſervations relative to the Pruning of Orchards.

SIR,

THE great improvements this country has received by the inſtitution of the Society for the Encouragement of Arts, Manufactures, and Commerce, giving an emulation to gentlemen to come forward, and communicate whatever may have a tendency to benefit the public, make me deſirous of laying before the Society ſome hints on the pruning Orchards, which ſubject appears to me to have been greatly neglected; but is capable of being methodiſed into a ſyſtem to ſuit the meaneſt capacity, and does not require the ſkill of a gardener; being reducible to a few general heads, concentrating in the principle of making every tree in an orchard healthy, round, large, and beautiful.

How far the hints may be worthy of the patronage of the Society, I cannot ſay; but ſhould feel myſelf highly gratified, if they could gain a place in their uſeful publications; for by that means they will become known in the country, and, if put in practice, would in great meaſure remove from the London markets the quantities of ſpeckled and ſtunted fruits conſtantly ſeen there; which in a great degree ariſes from the trees being overloaded with wood, that, obſtructing the rays of the ſun, cauſes an almoſt perpetual vapour, the cold of which, in the ſpring, ſtunting the fruit in the firſt growth, the evil muſt remain, let the weather ſet in ever ſo fine afterwards.

Every coſtermonger knows it is the fine fruit which ſells the orchard; for, of the inferior ſorts, many buſhels do not produce above a penny to the grower, after the expences of gathering and bringing to market are borne. The following experiment was made in the ſpring and autumn of 1790, on ſix acres of land fully planted with apples and cherries, on an old hop-ground, at Sittingbourne, in the county of Kent; and although the leaſe had eighteen years to run, I put myſelf to near 10l. expence, merely to ſhew the tenant what could be done, and which has fully anſwered the intended purpoſe.

If this has the honour of meeting with approbation, it may give an emulation in the country upon a ſubject almoſt overlooked, yet which is of eſſential concern; and if by example I can prove the preſent method erroneous, a little experience will inſenſibly lead to perfection; and then the practice will become general over the kingdom, and very properly comes under the article Agriculture; the various improvements of which owe their riſe to uſeful hints, ſtimulated by the encouragement of the Society.

I ſubſcribe myſelf,

SIR,

Your moſt humble ſervant,

THOS. SKIP DYOT BUCKNALL.

Conduit-ſtreet.

Mr. MORE.

SIR,

I NOW trouble you with a ſhort recital, for the inſpection of the Society for the Encouragement of Arts, Manufactures, and Commerce, on the pruning Orchards. I ſhall hereafter be aſſiduous in collecting uſeful hints from real practice, to throw the HUSBANDRY of ORCHARDS under proper regulations, that the ſubject may become worthy the attention and patronage of the Society.

I am, SIR,

Your moſt humble Servant,

THOS. SKIP DYOT BUCKNALL.

Canduit-ſtreet.

Mr. MORE.

Obſervations on pruning Orchards.

THE bark of trees, properly conſidered, conſiſts of three diviſions: the outer, rough; the middle, ſoft and ſpungy; the inner, a whitiſh rind, being that which joins the bark to the wood; and this laſt is ſuppoſed to contain the liquid ſap. It is conſtantly obſerved, that when the ſtem of the tree grows too faſt for the bark, it cauſes blotches and lacerations; which evil is properly avoided by ſcoring the bark with a ſharp knife: but care ſhould be taken not to cut through the whitiſh rind before mentioned; for that heals very difficultly, generally ulcerates, and by being cut through, gives the inſects * an opportunity of getting between the wood and the bark, where they are very deſtructive.

Any ſurgeon knows that a wound extending to the fine membrane, covering the bones of the human body, requires much more ſkill to cure than a fleſh wound; and the caſe is ſimilar.

Pruning is an important article with regard to the health of trees, and their bearing; and if judiciouſly done, they will come into bearing ſooner, and continue in vigour for nearly double their common age: but the ſyſtems of pruning are ſo wordy, that the common farmer cannot underſtand them, and the gardener thinks the orchard beneath his care, for which reaſon it is left to nature and the winds; for the farmer,

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* Inſects, ſuch as ants, earwigs, and many ſpecies of millepedes, with numerous microſcopic creatures, of which I know no name; but each of which obſtruct the healing of the wounds, by their conſtant eating and fretting the tender bark.

farmer, afraid of doing wrong, never troubles himſelf about it, unleſs, ſeeing a branch half broken, he takes his bill and knocks it off, perhaps four or five inches from the trunk, leaving an unſightly ſtump. Do not imagine this is intended as any reproach; for there are no ſet of men who ſpend their time more judiciouſly in their vocation, but they cannot run into ſpeculations; if they did, little rent would be paid. I give no attention to fruit branches and wood branches, as being unneceſſary in the preſent inſtance; and beg once for all, that no branch ſhall ever be ſhortened, unleſs for the figure of the tree, and then conſtantly taken off cloſe at the ſeparation, by which means the wound ſoon heals. The more the range of the branches ſhoot circularly, a little inclining upwards, the more equally will the ſap be diſtributed, and the better will the tree bear; for, from that circumſtance, the ſap is more evenly impelled to every part. Do not let the ranges of branches be too near each other; for remember, all the fruit and the leaves ſhould have their full ſhare of the ſun; and where it ſuits, let the middle of the tree be free from wood, ſo that no branch ſhall ever croſs another, but all the extreme ends point outwards.

The beſt compliment your neighbour can make is, that your trees are handſome, but too thin of wood: be it ſo; and you may ſay, True, Farmer; but I have the beſt price at market, and that will always be the ſure teſt of perfection.

My tenant, Mr. Boulding, planted the orchard in 1772: being on a rich ſoil, it throve ſurpriſingly. That vigorous growth occaſioned the after decay; for the wind having great power over them, ſplit them down; the ladders, in gathering, broke them; the wood being ſoft, many cauſes concurred to injure them; and the injudicious manner in which the lacerations were taken off, added to the evil; for there generally follows gum from a wound, which being ſweet in fruit-bearing trees, the

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wound becomes filled with vermin, which obſtructs the healing, by their conſtantly eating and fretting the young bark.

Being informed of the ſituation the orchard was in, I went down in the ſpring of 1790, and found the branches ſo intermixed and entangled together, that in many places they had cut each other nearly half through, cauſing wounds and blotches; which, on the return of the ſap in the ſpring, always affects the leaves, by inclining them to curl, and is a proof that the ſap is vitiated.

Having examined the circumſtances, I told the tenant I would come down in the autumn, when proper perſons muſt be found to execute the buſineſs, and we would reinſtate the orchard, and bring it to its former ſplendor; for it ſhould be obſerved, the orchard uſed to be much admired. Accordingly, I went the firſt Tueſday in November, and for two hours walked over the ground with the men, inſtructing them what I would have done, that we might begin the next morning, work with ſpirit, and loſe no time. We had ſaws, bills, and knives prepared on purpoſe; and, though I am a good hand myſelf, ſoon perceived neither of us could cut true enough with a bill to take off the branch, without leaving a ſtump or improper wound; for it is eſſentially neceſſary that every branch ſhould be cut perfectly cloſe and ſmooth; for which reaſon we took the ſaws, and afterwards ſmoothed the place with a knife. My ſervant's buſineſs was, with a painter's bruſh to ſmear over the wounds with a medicated tar hereafter deſcribed.

It is impoſſible the bark can grow over a ſtump, becauſe there is no power to draw the ſap that way; for which reaſon always cut a little within the wood. I was conſtantly directing to cut quick, cloſe, and ſmooth: we kept together, firſt walked round the tree; then I pointed out every branch that came near to the ground or had received any material injury, or where the leaves were much curled; for where the leaves curl, the fruit is always ſpecky; and every branch, which had the leaſt tendency to croſs the tree or run inwards, was taken off. Then we gave a little attention to the beauty of the head, leaving all the branches as nearly equidiſtant as poſſible: next we examined if there were any remaining blotches, opening or ſcoring them with the knife; and where the bark was ragged from any laceration, paring it gently down till we came to the live wood. Each of theſe was touched over with the medicated tar.

Having gone thus far, we ſhould have rubbed off the moſs and ſcored the trees: but I had not time for that part of the buſineſs; I only wiſh I had ſecured a perſon on purpoſe. In the cutting we followed the ſurgeons rule; go to the quick, but do not wantonly make any wound larger than neceſſary.

We ſometimes had our doubts whether a particular branch ſhould be taken off. The idea I brought it under was this: conſider whether it will be in the way three years hence; if it will, the ſooner it is off the better.

When trees are much thinned, they are ſubject to throw out great quantity of young ſhoots, in the ſpring, which I requeſted the tenants to be particularly careful to rub off: it is neceſſary that they be rubbed, and not cut; for cutting increaſes the number.

As our work drew near a concluſion, one of the tenants ſaid, We underſtand our buſineſs ſo well, that I wiſh we had another job; upon which my ſervant obſerved, You had better keep in your own pariſh, for the people are much diſſatisfied. The truth is, we had no comforters; for the country was againſt us. If the land had been under my own culture, I ſhould have taken off half as much more; but I did not chooſe to offend the perſons whom I wiſhed to inſtruct.

I went down again, in the ſpring of 1791, to ſee the effect, and found the tenants much pleaſed with the operation, and did not find one wound in an hundred but what was in a clear healing ſtate: and the healing of the wounds is the buſineſs; for nothing but prejudice can make a perſon think, that a tree overloaded with wood will produce good fruit: you may as well expect a crop of large turneps without hoeing; and I am in great hopes that pruning will become as general as hoeing; and I am ſure it is as neceſſary.

The medicated tar above mentioned, as uſed in the foregoing experiments, was compoſed of one quarter of an ounce of corroſive ſublimate, reduced to fine powder, by beating with a wooden hammer, and then put into a three-pint earthen pipkin, with about a glaſs full of gin, or other ſpirit, ſtirred well together, and the ſublimate thus diſſolved. The pipkin was then filled, by degrees, with vegetable or common tar, and conſtantly ſtirred, till the mixture was blended together as intimately as poſſible; and this quantity will, at any time, be ſufficient for two hundred trees.

To prevent danger, let the corroſive ſublimate be mixed with the tar as quickly as poſſible, after it is purchaſed; for, being of a very poiſonous nature to all animals, it ſhould not be ſuffered to lie about a houſe, for fear of miſchief to ſome part of the family.

SIR,

THIS is to certify, that our father planted the orchard, about the year 1773, on an old hop-ground, with apples and cherries, and took great care of it; and the trees grew wonderfully; but by being ſuffered to run with little pruning, and the branches breaking by the wind and other cauſes, the trees became galled and were decaying; which being mentioned to our landlord, Mr. Thomas Skip Bucknall, he came down the firſt Tueſday in November, 1790, and walked over the orchard with us, and an experienced woodman, for two hours, giving his inſtructions how he would have the work done; and we began at day-light the next morning, and kept conſtantly to our work until the Saturday night following.

The progreſs was thus: we ſtood and examined the tree, then cut out every branch any way decayed or galled, or where there appeared any curled leaves. That being done, we thinned the tree to give it a uniform head, and that the air and ſun might freely paſs through: afterwards, we took off all the ſtumps which had been injudiciouſly cut before. We never ſhortened a branch, but took it off cloſe to where it ſhot out from the other part of the tree.

Mr. Bucknall conſtantly attended, and was determined that we ſhould cut cloſe, ſmooth, and even, holding the left hand under the branch, that it ſhould not ſhiver the bark. We alſo took off every branch which croſſed the tree, leaving none but thoſe whoſe extreme branches tended outwards. We were ſometimes in doubt whether a branch ſhould be taken off or not. The rule Mr. Bucknall eſtabliſhed was, Conſider, will that branch be in the way three years hence: if it will, the ſooner it is off the better; and it is ſurpriſing how ſoon we got into ſuch a method, that we went on with as much unconcern, as with any of the common labours of the field. A ſervant was employed to ſmooth, with a knife, all the places where the ſaw had been, and to rub them over with the medicated tar; and that was done directly, that the wind ſhould not dry or ſplit the wood. Formerly, when we uſed to take off a large branch or two, the wounds generally cankered; which made us leave them in the encumbered ſtate they were in, rather than run any hazard; but, to our great ſurpriſe, the wounds, after this operation, all healed; which we can no otherway account for, but from what Mr. Bucknall ſays, that the medication deſtroys the vermin, and by cutting quite cloſe to the remaining branch, the flow of the ſap draws the ſides of the wounds together. Be that as it may, the trees are perfectly healed; and we are ſo well ſatisfied, that we intend to thin ſome of the trees a little more next autumn, and ſtrongly recommend the practice.

With regard to the fruit, laſt year was a failing year in the county; but we had as much as our neighbours, and the fruit was certainly clearer from ſpecks. We were alſo directed to be very careful to rub off all the ſuckers which might come out in the ſpring, and did it accordingly. All the trees have bloomed exceedingly fine, and perfectly ſtrong and healthy. Should any further circumſtance occur, we will inform the Society of it. We are, with great reſpect,

SIR,

Your obedient humble ſervants,

ROBERT BOULDING.
JAMES BOULDING.

Sittingbourne,
May 27, 1792.

Mr. MORE.

SIR,

THIS is to certify to the Society for the Encouragement of Arts, Manufactures, and Commerce, that, ſome time ſince, I appriſed Mr. Bucknall, that his orchard, in the occupation of Mrs. Boulding, lying in this place, was in a very declining ſtate; and in autumn, 1789, having ſome buſineſs with him, I again repeated to him my thoughts relative thereto; and that, if ſomething was not done to recover the trees, I ſuſpected that great part, if not all of them, would certainly die,

die. In the following ſpring, Mr. Bucknall came to Sittingbourne, and pointed out to the Mr. Bouldings (Mrs. Boulding's ſons) and myſelf, that where there was any blotch on the tree, or the bark, ſevered therefrom, the wound was full of vermin; which, he ſaid, was the cauſe of the trees doing ſo badly; and thereupon undertook to prune one of them, and uſed a medicine he bought in the town; but ſoon breaking his knife, little was done. He ſaid, he could eaſily reinſtate the trees, and bring them to health; and, if Mrs. Boulding would find three or four men, that he would come down again and prune them, and would be anſwerable the trees ſhould not ſuſtain any injury.

Accordingly, when Mr. Bucknall came down again, and pruned the trees, I attended whilſt ſeveral were done, and ſaw them all after they were done; but muſt mention, in juſtice to my own veracity, that I thought they made the trees appear too much like ſcare-crows. But now the trees have good heads, and are very full of fruit; I think, far beyond the crop in general; and the wounds healed, except three or four cherry-trees, which were ſo far gone, that Mr. Bucknall did not choose to touch them; and they are now almoſt dead.

I have but one more obſervation to make, and that I wiſh to impreſs upon the minds of the Society: that, in walking over the orchard this day, there is no one branch ſhortened; and I now ſee, that the merit of the pruning conſiſts in deſtroying the vermin, keeping the branches at a due diſtance, and leaving the extreme ſhoots perfect, that the tree may grow as round and large as poſſible.

I have the honour to be,

SIR,

Your very humble ſervant,

BR. FAUSSETT,

Attorney at Law.

Sittingbourne,
May 27, 1792.

Mr. MORE.

SIR,

THIS is to certify, that I have been long acquainted with the orchards planted by the late Mr. Thomas Boulding, on the lands of Thomas Skip Bucknall, Eſq. containing about ſix acres, ſituated in the pariſh of Sittingbourne; that the trees throve well for ſome time—I ſuppoſe, for the firſt ten or twelve years. After that time, many died; and many were wounded with the canker in the bark, from the bottom of the body even to the top arms: and the orchards, though in an infant ſtate, ſeemed going very faſt to decay (though as well managed as any in the neighbourhood the whole time). In November, 1790, Mr. Bucknall came to Sittingbourne, and was ſeveral days aſſiſting and directing his own ſervants, and Mrs. Boulding's people, in pruning the trees. After pruning, a medical preparation was applied to the wounds: the work ſeemed to be well done; but it was the opinion of many, that the trees were thinned too much.

I have ſeveral times ſince viewed the trees; and, by his deſire, went over the orchards this morning. I find the greateſt part of the trees in a very good thriving way: thoſe that were in a very bad ſtate ſeem recovering faſt; the wounds in the bark, and thoſe occaſioned by pruning, are healing very faſt. I am ſo convinced of the propriety of the treatment, that I intend practiſing the ſame myſelf. I beg my reſpects to the Society; and am, SIR,

Your moſt humble ſervant,

JOHN LAKE.

Bapchild,
May 28, 1792.

Mr. MORE.

SIR,

IN anſwer to your requeſt of the 13th ult. concerning the preſent ſtate of the orchard which I now occupy, as tenant, and under the direction of Thomas Skip Bucknall, Eſq.

The orchard is now in good condition; and, by experience, I highly approve of pruning the trees: though this laſt ſeaſon was very unfavourable for all kinds of fruits, ſtill the fruit, the produce of this ſeaſon, far exceeds the quality of that of my neighbours. The Flemiſh cherry was every tree blighted, owing to the ſharp froſty mornings, when in bloom; therefore produced no fruit this year. The produce of the Engliſh cherry, May-duke, amber-heart, Turkey-heart, white-heart, and black-heart, very large, fine, and plentiful, far exceeding that of my neighbours. The apples far exceed all this part of the county; the produce plentiful, and very fine in quality; free from ſpecks, and of a fine ſize: that of my neighbours, the produce ſmall, fruit ſmall, and very ſpecky; therefore, of a very bad quality.

I am, SIR,
Your obedient ſervant,
ROBERT BOULDING.

Sittingbourne,
Nov. 17, 1792.

Mr. MORE.

SIR,

I BEG the favour of you to make my acknowledgements to the Society for the Encouragement of Arts, Manufactures, and Commerce, with many thanks for their attention to me, in adjudging their Silver Medal, as a reward for the aſſiduity I have ſhewn, to bring the pruning of Orchards to ſuch a determined ſtate as to make the trees healthy, beautiful, and productive.

I flatter myſelf that, from the proofs of the utility of the method, and the countenance it has received, an emulation will be excited in the country for bringing that branch of Agriculture to vie with others, which owe their riſe to the honourable patronage given by the Society to every object which promiſes to produce any public utility.

I have the honour to be,

SIR,

Your moſt obliged humble ſervant,

THOMAS SKIP DYOT BUCKNALL.

Hampton-Court,
Dec. 4, 1792.

Mr. MORE.

The four following Papers having been ſent, in claim of the Premium offered for Comparative Culture of Wheat; the SILVER MEDAL and TWENTY GUINEAS were adjudged to Mr. ARTHUR TABRUM, he having cultivated the largeſt quantity of land, to aſcertain the advantages of thoſe different methods of culture. But the Society, in conſideration of the merits of the three other Papers, voted to each of the Candidates a SILVER MEDAL, as marks of their approbation of the accuracy of the experiments made by them.

MY LORDS AND GENTLEMEN,

FROM the year 1781 to 1788, I practiſed farming, in the old broad-caſt way, on various ſoils, but chiefly light.

Michaelmas, 1789.—I borrowed one of Cooke's old machines, and drilled about ſeven acres with wheat, by way of experiment; the ſucceſs of which induced me to purchaſe one of his new ones, for my own uſe.

Michaelmas, 1790.—I drilled all my wheat; and in the ſpring following, my Lent corn and turneps: and I had no reaſon to be diſſatisfied with drilling.

Michaelmas, 1791.—Having a piece of land, called Cowhouſe Field, of ſixteen acres, a light ſandy loam, the ſoil of equal quality throughout, and in the ſame ſtate of cultivation exactly; it occurred to me to make the experiment, as propoſed by the Society for the Encouragement of Arts, Manufactures, and Commerce. This field, in the ſpring 1791, was drilled with ſummer tares, fed off the latter end of July, and ploughed three times afterwards for wheat. The laſt week in October, 1791, I drilled at nine inches ſix acres and ſixteen

rods,

rods, at one ſide of the field, with ſix pecks per acre; and ſowed, at the ſame time, the remainder of the field, broad-caſt, with twelve pecks per acre. It was then very wet weather: the wheels of the drill balled or clogged much; but I did not ſee that the plant came up the worſe for it. Both the drill and broad-caſt were attacked by the wire-worm; but the broad-caſt did not appear to ſuffer ſo much as the drill: through the winter the broad-caſt looked better than the drilled, being a much fuller plant.

February 1, 1792.—I ſcarified the drill wheat deep, viz. four or five inches, which threw the mould upon the plants very much; but was in a day or two harrowed off, by going acroſs with common harrows, and was repeated in about a fortnight. This ſtirring of the ſoil gave the plants freſh vigour; but, in my opinion, deſtroyed a great number of plants, the ſoil being light. I have ſince got a ſet of light harrows, with wood teeth, for that uſe; which does the buſineſs much better. From this time, and through the months of March and April, the drill plants, though thin on the ground, appeared much more healthy, and a darker green than the broad-caſt, which was then very yellow and ſickly.

May 5.—Hand-hoed, and harrowed, the broad-caſt, according to my cuſtom: ſame time the drill was hand-hoed; the broad-caſt, at 5s. per acre; the drilled, at 3s. per acre. It is not my practice to hand-hoe my drilled crops; for I think horſe-hoeing is by far the beſt: but I had ſo thin a plant, from the worms, &c. that I was afraid the man could not ſee the rows, ſo as to work the horſe-hoe properly; otherwiſe, I ſhould have horſe-hoed at 6d. per acre, in preference to hand-hoeing, if both at a price.

The latter end of May, and beginning of June, the drilled branched out ſurpriſingly, and maintained its ſuperiority, in ſtrength of ſtraw, and longer ears, till harveſt; when both drill and broad-caſt, viz. ſix acres ſixteen rods each were reaped ſeparately, carried ſeparately, and ſtowed ſeparately

rately in the barn; alſo thraſhed ſeparately, by the ſame ſervants: when it appeared, that the produce of the ſix acres broad-caſt, leaving out the ſixteen rods, to avoid fractions, of both drilled and broad-caſt, was one hundred and fifteen buſhels, or nineteen buſhels per acre; the produce of the ſix acres drilled, one hundred and twenty buſhels three pecks, or twenty buſhels one gallon per acre; difference, in favour of the drilled, one buſhel one gallon per acre. The quantity of ſtraw broad-caſt is two hundred and thirteen truſſes, of thirty-ſix pounds per truſs; from the drilled, two hundred and fifty-five truſſes; which, at three-pence per truſs, for home conſumption, leaves ten ſhillings and ſixpence, or one ſhilling and nine-pence per acre, in favour of the drilled. The grain of both crops I ſold to Mr. William Smith, of Bow, Middleſex; the broad-caſt at five ſhillings and three-halfpence per buſhel—the drilled, at five ſhillings and four-pence halfpenny: difference, in quality of grain, by the drill, at three-pence per buſhel, is five ſhillings per acre, without fractions. This difference in quality of the grain of the drilled crop, I attribute to the crop having fewer weeds in it than the broad-caſt; the expence of drilling and broad-caſt equal.

The average advantage, in favour of drilling, per acre, is as follows:

	£.	s.	d.
Seed ſaved, per acre, at 6s. per buſhel — — —	0	9	0
Superior crop, ditto —	0	5	4½
More ſtraw, ditto —	0	1	9
Better quality of grain, ditto	0	5	0
More labour beſtowed on the broad-caſt crop, per acre	0	1	4
	£.1	2	5½

The above ſtatement reſpects the crops of the drilled and broad-caſt. There remains a circumſtance to be taken into the caſe, viz. the difference of the preſent condition of the land of the drill and the broad-caſt: the former, by ſcarifying, harrowing, and hoeing, is clean, compared with the broad-

caſt,

caſt, and fit for a ſpring crop: the latter is foul, and fit for a fallow only. This difference of cleanneſs I eſtimate at twenty ſhillings per acre, in favour of the drill; at leaſt, it would coſt me as much to make the broad-caſt land as clean as the drilled. I muſt own, at one time in the ſpring, before I ſcarified the drilled crop, I had doubts of its ſucceſs; and I do believe, that if it had not been ſcarified, and harrowed early, it would have failed; but it improved ſo much after it was ſcarified, that I am perſuaded the ſucceſs was owing to that performance; and it is my opinion of drilling in general, that if it is not practiſed according to Mr. Cooke's directions, of ſcarifying early, it would not anſwer on my farm.

The latter end of July, 1792, I drilled, with Cooke's drill, a field of fourteen acres, with 14 ounces of turnep-ſeed per acre; and I never had a better crop: they were fed off with ſheep and bullocks on the land. Afterwards, with the aſſiſtance of Mr. Cooke's ſcarifyers and ſcufflers, I procured a ſufficient tilth for my barley ſeaſon, without ploughing at all, ſave and except one acre in the middle of the field, which was ploughed as uſual, by way of experiment. At harveſt, the ploughed acre was not ſo good a crop, and much fouler, with ſummer weeds, poppy, blue-bottle, &c. By cultivating with the ſcarifyers and ſcufflers, as above, I ſaved four ſhillings and ſixpence per acre. Some of my neighbours plough three times for barley, and do not get ſo good a tilth, nor a better crop than I got without it.

The latter end of March, I drilled the above fourteen acres, with ſix pecks of barley per acre. As ſoon as I could ſee the rows, I ſcarified and harrowed acroſs, with my light harrows with wood teeth; when my neighbours declared I had ſpoiled my crop. A gentleman of much experience in farming, who was at my houſe, and went into the barley, the day after the operation of ſcarifying, declared I had ſpoiled my crop, and that I could not expect to get any barley: nevertheleſs, I had confidence in Mr. Cooke; and in a fortnight after I ſcarified, and harrowed acroſs again. The firſt week in May, I horſe-hoed, and drilled in my clover ſeed, in the middle of the intervals, and have got a fair plant; and by the middle of May, none of my neighbours could ſay my crop was ſpoiled. I eſtimate the produce at forty buſhels per acre, from a piece of poor gravelly ſand, which never brought me more than twenty-four buſhels before. A root, and its produce, I have ſent.

I have now growing twenty-two acres of drilled wheat, and eleven acres of rye, which look well: one of the pieces of wheat was drilled after turneps, which were deſtroyed by the fly: this field was once ploughed about Chriſtmas, 1791, and has not been ploughed ſince. The tilth for turneps was obtained by the ſcarifiers and ſcufflers; alſo for the wheat, after the turneps failed, by the ſcarifiers and ſcufflers, and is cleaner by far than any tilth wheat I have in the old method, at half the expence of ploughing. I would recommend the land to be deep and well ploughed at Chriſtmas, or ſooner, for this practice.

I am,

My Lords and Gentlemen,

Your moſt humble ſervant,

ARTHUR TABRUM.

Aveley, Eſſex,
Feb. 1, 1793.

To the Society for the Encouragement of Arts, &c.

SIR,

THIS is to certify, that I meaſured, for Mr. Arthur Tabrum, a quantity of land, being part of the Cowhouſe Field; which ſaid field contained ſixteen acres; and, on the north ſide, I meaſured off ſix acres, ſixteen rods, which was ſowed with a drill a drill at nine inches; and the part next adjoining, I meaſured exactly the ſame quantity, which was ſowed broad-caſt, as was the remainder of the field. The field lying near the road, where I often paſſed, I frequently viewed the crops of corn, and believe them to be fairly ſtated.

WILLIAM MAYDEN,
Schoolmaſter.

Aveley, *Eſſex*,
Feb. 1, 1793.

Mr. MORE.

SIR,

I LIVE very near Mr. Arthur Tabrum; our lands are adjoining. I frequently walk with him; and I ſaw his ſeveral operations on the comparative crops of wheat, growing in his field, called the Cowhouſe Field; and I firmly believe his ſtatement is perfectly right; and was preſent

ſent when the threſhers declared, that every care was taken, and that they were ſeparately threſhed, and likewiſe the difference of ſtraw in the two crops; and I am, for my own part, more partial to the drill ſyſtem than I ever was.

I am, Sir,

Your humble ſervant,

Robert Shave.

Aveley, Eſſex,
Feb. 4, 1793.

Mr. More.

SIR,

FOR ſome years I have drilled different ſorts of corn, but did not make any accurate experiments to determine the comparative advantages of the drill and broad-caſt, till I obſerved a wiſh, expreſſed by the Society, of ſuch an experiment being made.

In conformity to their propoſals, I have the honour to ſend you three different ſets of experiments, the firſt of which ſeems to be, in every point, agreeable to the advertiſement. It is neceſſary for me to explain why I have carried my enquiries further than what related to the eight acres: you will obſerve, that I have not only endeavoured to aſcertain the comparative excellence, between the two modes of ſowing, but have alſo attempted to diſcover which of the three drills will produce the beſt crop; whether the drills ſhould be at nine or eleven inches; and whether a larger or ſmaller quantity of ſeed has the beſt proſpect of ſucceſs. Theſe were objects which appeared to me worthy of inquiry: how far I have ſucceeded, I leave to the deciſion of the Society. All that I lay claim to, is credit for impartiality and correctneſs: not confiding in my ſervants, but truſting alone to my own perſonal obſervation, at every period of this experiment, from ſowing the ſeed to meaſuring the produce, I am able to make myſelf reſponſible for the account I ſend you.

My firſt experiment was made upon a very heavy clover ley, which, when ploughed, was very rough: here the drill was inferior to the broad-caſt. In my ſecond experiment, the latter appeared to be, by far, the moſt promiſing crop till the month of April, when the former made a moſt extraordinary progreſs. Not being uſed to Perkins's drill, I ſowed too ſmall a quantity of ſeed: till the month of May there was ſo thin a plant, that I ſhould have ploughed it up, if I had not wiſhed to ſee the effect of a ſmall quantity of ſeed. In my third experiment, the drill was again victorious; and, indeed, I have not the ſmalleſt doubt of its ſuperior merit, whenever it is uſed properly, upon ground fit to receive it.

I have in contemplation, a mode of culture of wheat, which I think will be well adapted to the drill; and alſo be likely to overcome the ravages of the worm, which is very apt to attack our wheat ſown on a clover ley. Inſtead of ſowing my clover land with our wheat, I mean to plant it with beans; which I ſhall keep clean by horſe-hoes, and I ſhall drill wheat after the beans.

I muſt now inform you, that all the drilled wheat, of which I have the honour to ſend you an account, was twice horſe-hoed, and once hoed by hand: the broad-caſt wheat was alſo hoed by hand. The fifteen parcels were houſed in fifteen different places, and were ſeparately threſhed with the greateſt care: I have ſamples of each parcel ready for the inſpection of the Society, if deſired. I think, I need not ſay, that theſe experiments have been attended with no ſmall degree of trouble; but I ſhall not think it miſplaced, if the reſult of them ſhould throw any light upon a purſuit a purſuit, which is my buſineſs and delight.

I have the honour to be,

SIR,

Your moſt obedient humble ſervant,

MONTAGUE BURGOYNE.

Marſh Hall, Harlow,
Eſſex, Feb 4, 1793.

Mr. MORE.

You will perhaps be ſurpriſed, that I ſhould accommodate my firſt experiment more exactly to the rules of the Society, than I have done in my ſecond and third. The fact is, I was not aware that the experiment ſhould be tried on eight acres; and beſides, I had not a ſufficient quantity of ground in the ſame field, of equal goodneſs. I hope, however, that it will be underſtood, that I have ſtrictly conformed to the rules preſcribed: and I beg leave to remark, that the account of the failure of the drill, in one inſtance, may, perhaps, afford as much information to the agriculturiſt as the other two experiments which have ſucceeded,

An Account of Eight Acres of Wheat, ſown on Mark Hall Farm, in the County of Eſſex, in a Field called Lodge-Croft, on a Clover Ley, of two Years. The Soil a heavy Loam, on an Underſtratum of Clay. It was ſown the 1ſt of November, 1791, *and reaped in Auguſt,* 1792.

	Seed ſown		Produce			Straw
No.	Bls.	Pks.	Qrs.	Bls.	Pks.	Truſſes
1 An acre ſown with Ducket's drill at 9 inches	2	2	2	6	½	58
2 An acre ſown with Ducket's drill at 11 inches	1	2	2	4	½	56
3 An acre ſown with Ducket's drill at 9 inches	3	¼	2	4		56
4 An acre ſown with Cooke's drill at 9 inches	1	3	2	6	¾	59
Total of four acres drilled	8	3¼	10	4	1¾	229
5 Four acres broad-caſt	13	2	13	5	3½	285
Difference in favour of the Broad-caſt			3	1	1¾	65

An Account of Four Acres of Wheat, ſown October 15, 1791, on the ſame Farm, in a Field called Lodge Croft; the Soil a heavy Loam, with an Underſtratum of Clay. The Part ſown had been broken up in the May preceding, after being twenty months in Clover, and was become a good Tilth. The Wheat was reaped in Auguſt, 1792.

No.	Seed ſown		Produce			Straw
	Bls.	Pks.	Qrs.	Bls.	Pks.	Truſſes
6 One fifth part ſown with Ducket's drill at 11 inches	1	2½	3	6	1	90
7 One fifth part ſown with Cooke's drill at 9 inches	1	1½	3	6	3	99
8 One fifth part ſown with Ducket's drill at 9 inches	2	½	3	6	½	95
9 One fifth part ſown with Perkins's drill at 9 inches		3½	3	5	1	86
10 One fifth part ſown broad-caſt	2	¼	3	5	½	102

An Account of Five Acres of Wheat ſown on the ſame Farm, in a Field called the Broom Field, on a Clover Ley of One Year; the Soil a ſandy Loam, on an Underſtratum of Gravel. It was ſown November 5, 1791, *and reaped in Auguſt,* 1792.

No.	Seed ſown		Produce			Straw
	Bls.	Pks.	Qrs.	Bls.	Pks.	Truſſes
11 One acre ſown with Ducket's drill at 11 inches	1	3½	3	5	3	90
12 One acre ſown with Ducket's drill at 9 inches	2	2½	4			95
13 One acre ſown with Cooke's drill at 9 inches	1	2½	3	5	2¾	82
14 One acre ſown with Ducket's drill at 9 inches	3		3		½	52
15 One acre ſown broad-caſt	2	3	3	4	½	70

N. B. From the firſt ſet of experiments it appears, that the produce of the broad-caſt exceeds the drill by three quarters one buſhel one peck and three quarters; yet as there is a ſaving of four buſhels two pecks and three quarters by the drill, the profit of the former is reduced to two quarters four buſhels and three pecks.

SIR,

THE Society for the Encouragement of Arts, Manufactures, and Commerce, having offered an Honorary Medal for the moſt approved ſet of experiments, made on eight acres of land, to determine the comparative advantages of cultivating wheat by broad-caſt or drilling; it is with great deference the following account is ſubmitted by,

SIR,

Your moſt obedient humble ſervant,

EDWARD TRELAWNY.

Upminſter, Eſſex,
Feb. 2, 1793.

Mr. MORE.

Experiments on the Drill and Broad-caſt Huſbandry of Wheat, made on Eight Acres Three Roods of Land.

THE field, in which the major part of my efforts were made, towards aſcertaining the comparative merits of the two modes of culture, contains ſeven acres two roods; the ſoil an excellent light dry loam, in the following ſtate of cultivation, viz.

1789, Turneps.
1790, Barley.
1791, Clover.

The turneps, an extraordinary good plant, were twice hoed, and fed off with ſheep. The barley, full ſix quarters per acre; but the bulk of ſtraw being great, and heavy rains falling about three weeks before harveſt, occaſioned nearly the whole to be lodged: a material injury to the clover was the conſequence; added to which, the extreme drought in the following month of May and part of June, operated ſo powerfully, that the whole crop conſiſted of only five light waggon loads; and that, unaccountably foul with catlock, needles, &c. notwithſtanding the turneps and barley were both exceeding clean. Upon this I determined to try the effect of a ſhort fallow; accordingly it was immediately ploughed, which was repeated in Auguſt, with proper harrowing, &c. during the interval: this, as far as could be judged at that ſeaſon, appearing to have anſwered the purpoſe intended, it lay till ſeed-time. Between the 27th of October and the 3d of November, after a third ploughing, it was ſown as under, viz. three acres one rood and twenty perches broad-caſt, and the like quantity drilled with the Reverend Mr. Cooke's machine, in equidiſtant rows of nine inches; the remaining three roods were contained in the head lands and gores, or ſhort lands, which I left out of the queſtion. The drilled was ſcarified the 30th of March, 26th of April, and the

19th of May; the vegetation ſeemed to be conſiderably aſſiſted thereby, eſpecially the firſt time. I ſhall defer giving the quantity of ſeed and crop to a particular detail hereafter of the whole.

The following is a ſtatement of the remaining two acres, the ſoil of which is a ſound mellow loam, of a ſtronger nature than the preceding piece, but much exhauſted by the deſtructive ſyſtem of barley, oats, or wheat, in ſucceſſion. However, I fixed on this ſpot, after early hog peas, in 1791, in the middle of a field of thirteen acres, for the ſole purpoſe of experiment between one acre on a ſingle ploughing, and the other after three ploughings. This comparative trial ſuggeſted itſelf to me under the general idea, that, without a proper tilth for the coulters to work, the drill culture will not ſucceed. I wiſhed to prove this as nearly towards a clear demonſtration as poſſible; I therefore ploughed one part in Auguſt, again in September, and about the 24th of October: after a third ſtirring, one half drilled, the remainder broad-caſt, the other acre on one ploughing, equally divided in like manner, drilled and broad-caſted the ſame day. The latter of both experiments were hand-hoed twice, the beginning of April and early in May; the drilled, ſcarified the 30th of March, horſe-hoed the 26th of April, and again ſcarified the 19th of May. My obſervations during the growth of both fields were exactly as have been remarked by the generality of drillers, viz. that the broad-caſt ripened earlieſt, the ears of the drilled conſiderably the longeſt and fulleſt ſet; and, from the ſtrength of ſtraw, ſtood the heavy rains and winds beſt.

Each diviſion was carefully ſeparated at harveſt, under the immediate eye of myſelf, or a friend, to whoſe ſedulous attention I am much indebted. Memorandums were made of the places and manner of houſing; and I am equally clear as to the threſhing, being preciſely conformable. It remains to give the detail, which, I flatter myſelf will, on examination be found correct.

Wheat, ſix Acres three roods, after a ſhort fallow with three ploughings.

	Qr.	B.	P.	G.
One acre drilled with two buſhels, produce	3	5	3	1
One acre drilled with one half-buſhel, produce	3	5	0	0
One acre drilled with one quarter ditto	3	4	3	0
	10	7	2	1
Three acres ſowed broad-caſt with ſix buſhels one peck	9	0	3	0
Difference in favour of the drill on three acres	1	6	3	1

	B.	*P.*	*G.*	*Q.*	*B.*	
Twenty perches, drilled with one gallon one quart, or one buſhel one peck per acre, produced	3	1	1 or	3	3	per acre
Twenty ditto broadcaſted with the ſame quantity, produced	2	1	1	2	3	ditto
Twenty ditto, drilled with two gallons two quarts, or two buſhels two pecks per acre, produced	3	1	0	3	2	ditto
Twenty ditto broadcaſt with the ſame quantity, produced	2	3	1	2	7	ditto
Twenty ditto, drilled with three gallons or three buſhels per acre, produced	3	0	1	3	1	ditto
Twenty ditto, broadcaſt with the ſame quantity ditto, produced	3	1	1	3	3	ditto

Six acres three roods, total of ſhort fallow.

The experiments of twenty perches were made with a view towards coming at a ſtandard quantity of ſeed: upon a reference, it appears, that one buſhel one peck per acre drilled, and two buſhels two pecks per acre broad-caſt, were the moſt proportionably productive. Taking the account in the aggregate, the drill has conſiderably the advantage, as thus:

				£.	s.	d.
Three acres one rood twenty perches, drilled with five buſhels two pecks three quarts, produced twelve quarters one buſhel one peck one gallon, at 44s. - -				26	15	7
Expences.						
Five buſhels two pecks three quarts of ſeed, at 6s. 6d. - -	1	16	5			
Drilling, per acre, at 1s.	0	3	5			
Three ſcarifyings, at 9d. - - -	0	7	0			
Threſhing, at 4s. -	2	8	9			
				4	15	7
Net produce				£.22	0	0

Three

		£.	s.	d.
Three acres one rood and twenty perches, ſowed broad-caſt, produced ten quarters one buſhel one peck one gallon, at 44s. — —		22	7	7
Expences.				
Seven buſhels three quarts of ſeed, at 6s. 6d.	2l. 6s. 1d.	4	6	10
Threſhing	2l. 0s. 9d.			
Net produce		£.18	0	9

leaving 3l. 19s. 3d. in favour of the drill; which is 1l. 3s. 6d. per acre, within a trifling fraction

One Acre, on one Ploughing.

		£.	s.	d.
Produce of two roods broad-caſt, one quarter one buſhel, threepeck one gallon, at 44s.		2	14	4
Expences.				
One buſhel of ſeed,	6s. 6d.	0	15	9
Two hand-hoeings,	4s. 3d.			
Threſhing - -	5s. 0d.			
Net produce		£.1	18	7

		£.	s.	d.
Produce of two roods drilled, one quarter one peck one gallon, at 44s. - -		2	6	0
Expences.				
One buſhel of ſeed,	6s. 6d.			
Drilling, - -	0s. 6d.			
Two ſcarifyings and one horſe-hoeing -	1s. 2d.			
*Hand-raking, after horſe-hoeing, - -	0s. 9d.			
Threſhing - -	4s. 4d.			
		0	13	3
Net produce		£.1	12	9

Leaving 5s. 10d. or 11s. 8d. per acre, in favour of the broad-caſt.

Experiment

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* It has been uſual to harrow the lands acroſs, after horſe-hoeing; but having experienced its miſchievous tendency, of frequently burying the plants ſtill more, beſides tearing others up, the raking with common hand-rakes occurred to me. This perfectly anſwered the end, and, I am of opinion, will be adequate to clear the rows, without injury in the ſmalleſt degree.

Experiment of one Acre, after three Ploughings.

		£.	*s.*	*d.*
Two roods drilled, produced one quarter four buſhels two pecks one gallon, at 44s.		3	10	1
Expences.				
One buſhel of ſeed	6s. 6d.			
Drilling - -	0s. 6d.			
Two ſcarifyings and one horſe-hoeing -	1s. 2d.			
Hand-raking, after horſe-hoeing - -	0s. 9d.			
Threſhing - -	6s. 5d.			
		0	15	4
Net produce		£.2	14	9

		£.	*s.*	*d.*
Two roods ſown broad-caſt produced one quarter three buſhels one peck, at 44s.		3	1	10
Expences.				
One buſhel of ſeed,	6s. 6d.			
Two hand-hoeings	4s. 3d.	0	16	5
Threſhing	5s. 8d.			
Net produce		£.2	5	5

leaving 9s. 4d. or 18s. 8d. in favour of the drill.

The experiment on the eight acres three roods being conſolidated, it will appear, that four acres one rood twenty pecks drilled, left a net return of 26l. 7s. 6d. and four acres one rood twenty perches, broad-caſted, 22l. 4s. 9d. or near 18s. per acre in favour of the drill ſyſtem.

Throughout every ſtage of theſe experiments, I have diveſted myſelf of that partiality which the drill culture, from the benefit I have derived during three ſucceſſive harveſts, lays claim to: and it is with ſome degree of vanity I reflect, that my ſucceſs has been the means of extending the practice.

If I have in theſe accounts been prolix in my calculations, I reſpectfully hope the Society will attribute it to my wiſh to give an exact ſtatement of the expenditure, as well as product: without both, I conceive the whole muſt be deficient.

I am perſuaded the judicious farmer will find ample room for cenſure of the mode I adopted in the preparation of my lands for theſe experiments: I will therefore beſpeak his candour, by aſſuring him, they are the feeble attempt of a junior brother of the plough, now only in the fourth year of his attendance on the Goddeſs Ceres.

⁂ It may not be improper to note, that the crop from the ſix acres three roods, ſhort fallow, was but little affected with the weeds complained of in the clover, being a very fair ſample.

EDWARD TRELAWNEY.

Upminſter, *Eſſex*,
Feb. 2, 1792.

SIR,

THE Society for the Encouragement of Arts, Manufactures, and Commerce, having offered the Gold Medal as a reward for the Comparative Culture of Wheat, I beg you will be ſo obliging as to lay the following experiments before them.

The land on which the experiment was made, is eſteemed a very good brown light ſoil, few ſtones, dry, and inclining gently to the ſouth, chalk bottom about thirty inches deep. The year before, it was ſown with barley and clover-ſeed only; the graſs was made into hay, about the middle of June, 1791. The eight acres cloſe together were immediately manured, and ploughed in: it lay in that ſtate until ſeed-time; then dregged, and harrowed down. the four acres were drilled firſt with Cooke's plough, two buſhels one peck to each acre; finiſhed in the laſt week in September, 1781. The four acres cloſe adjoining, broad-caſt, were finiſhed the firſt week in October, 1781: I allowed three buſhels to an acre of each—nine gallon meaſure. The eight acres were then rolled down.

The crops came up well, and flouriſhed during the winter and ſpring: the ground was rather free from weeds; but I had both crops hoed by women, in the month of April. The ſummer proved very wet and ſtormy, which hurt the crops not a little. About the middle of Auguſt, the eight acres were reaped, and the corn houſed in good condition; great care taken to ſeparate them in the barn. The drilled was firſt threſhed out, which produced fifty-three buſhels one peck and one gallon clean corn. The broad-caſt produced ſixty-four buſhels three pecks and one gallon clean corn; both excluſive of tithes, and Wincheſter meaſure: it was ſold in the pariſh of Ropley, for 14l. per load for ſeed. The drilled had not near ſo many hulls as the broad-caſt. The weight of one buſhel of drilled was ſixty-one pounds; of the broad-caſt, ſixty-three pounds and one half.

I ſhall be very happy if this experiment meets the approbation of the Society. I have taken the liberty of ſending them a ſample of each. I beg my moſt reſpectful compliments to thoſe Gentlemen; and am, SIR, with eſteem,

Your moſt obedient ſervant,

JAMES RODNEY.

Ropley, near Arleſford, Hants,
October 5, 1792.

Mr. MORE.

I DO certify, from almoſt daily obſervation, from the time of the wheat being ſown to its being houſed in the barn, that the account given by Mr. Rodney is a juſt and fair account, and appears, in my opinion, deciſive in the comparative culture of Wheat, under the given circumſtances of ſoil and ſituation.

WILLIAM HOWLEY,
Vicar of Ropley.

Ropley,
Nov. 3, 1792.

The THANKS of the Society were given to JOSEPH SIBLEY, Eſq. of Market-ſtreet, Hertfordſhire, for the following Communication, which may throw ſome light on the long-agitated queſtion concerning the Tranſplanting and Dividing the Roots of Corn.

SIR,

WHEN I had the pleaſure of ſeeing you laſt, I left with you a ſmall box, containing two thouſand grains of wheat, the produce of one grain in one year. I have now ſent you the root and ſtalks upon which they grew, which I beg the favour of you to preſent to the Society for Encouragement of Arts, Manufactures, and Commerce, if you think they will be acceptable. I ſhall juſt add a ſhort account of the plant.

In September, 1790, I ſowed ſix grains of wheat in a garden-pot. In February, 1791, they were turned out of the pot, when their roots were very numerous, and much interwoven: they were tranſplanted into the garden, in a ſingle row, at one foot diſtance, the roots and tops being firſt ſhortened, where they ſoon filled the ſpace between each other; when one of the internal plants was taken up, and divided into ten parts, each having a ſmall fibre, and tranſplanted in one row, a foot from each other: this was done in order to ſee the difference between dividing the root, and that which was not divided, as much as has been ſaid concerning the tranſplanting and dividing the roots of corn. The plants were kept clean from weeds. The produce as follows:

Auguſt, 1791.---The plants were taken up; and that whoſe root had not been divided, produced one hundred ears, containing two thouſand grains. Another, whoſe root had been divided, produced altogether ninety ſtalks and ears; but the number of the grains could not be aſcertained, as the birds had carried away the greateſt part of them; whereas the former was preſerved by a net.

I ſhall not make any remark on the wonderful fertility of this plant, as I have no ſyſtem to favour or recommend, but have merely related the fact; and will leave to the Society (of which I have the honour of being a Member) to make their own remarks, hoping they will do me the favour to accept this ſmall preſent, which I have taken the liberty of tranſmitting to you.

I remain, SIR,

Your moſt obedient ſervant,

JOSEPH SIBLEY.

Market-ſtreet,
Jan. 26, 1793.

Mr. MORE.

The SILVER MEDAL and TEN GUINEAS, being the Premium offered for Stall-feeding Horſes with Green Vegetables, was this year adjudged to Mr. PETER SMITH, of Hornchurch, Eſſex; from whom the following Papers and Certificates were received.

MY LORDS AND GENTLEMEN,

HAVING obſerved that the Society for the Encouragement of Arts, Manufactures, and Commerce, have offered a premium for feeding horſes with green vegetable food, I take the liberty of ſubmitting to the Society's conſideration, the following experiments, which have been made with the greateſt exactneſs.

From the 21ſt of April, 1792, to the 22d of September following (twenty-two weeks), I kept four horſes in the ſtable on green rye, winter and ſummer tares; rye, two roods and two perches; winter tares, one acre one rood and ten perches; ſpring tares, two acres one rood and ſeventeen perches, one rood of which was left unconſumed: conſequently, the whole quantity of land on which theſe green vegetables were produced, amounts to three acres three roods and twenty-nine perches. The expence as follows:

	£.	s.	d.
One ploughing after wheat, at 6s. per acre - - -	1	3	7½
Seed - - - -	2	16	0
Harrowing - - -	0	1	3
Rent and Taxes - -	3	19	0
	£.7	19	10½

Which, omitting the fractions, is one ſhilling and ninepence three farthings per week for each horſe. This, I believe, would have ſupported my horſes, at common farmers work, with little or no corn; but, as they did nearly double work, I gave an extra quantity of corn, viz. fifteen quarters five buſhels, which I value at fourteen pounds ſixteen ſhillings and ten-pence, or three ſhillings and three-pence farthing per week, each horſe.

If my horſes had been at graſs in the field, I ſhould have given them the ſame quantity of corn, on account of their hard work. One of the advantages of ſtall-feeding conſequently appears from the difference of the value of the food conſumed, compared with the value of common graſs, which is near one hundred per cent. in favour of ſtall-feeding; the expence of green food being, as above ſtated, one ſhilling and nine-pence three farthings per week, each horſe: but if my horſes had been at common graſs, I ſhould value their keep at three ſhillings and ſix-pence, or four ſhillings, per week, each horſe.

From the time I began to keep my horſes with green vegetables, as above, to the laſt week in Auguſt, they were in a thriving ſtate: afterwards, they did not do ſo well, on account of the wetneſs of the ſeaſon, which mildewed the tares. During the above twenty-two weeks, my horſes had no reſt whatever on working days. The firſt month they carted dung from Romford, three journeys a day, of ſeven miles per journey; the loads of dung, from two and a half to three tons per load: the remainder of the time, they went three times a week to London with ſtraw, and brought dung and chalk rubbiſh back; each journey, thirty-three miles: the other days, at plough, ſcarifying, ſcuffling, fallows, hay-cart, harveſting, and other work on the farm: the weight of the dung obtained from my own horſes, during the ſtall-feeding, wsa eighteen tons one hundred one quarter and ſixteen pounds, calculated from the produce of ten weeks, weighed at ten ſeparate times. I have charged nothing for the carter's time in cutting the green food, as it came within his day's work; and they were carted home by the ſame horſes that conſumed them, as much at one time as would laſt two days.

I am,

My Lords and Gentlemen,

Your moſt obedient humble ſervant,

PETER SMITH.

Hornchurch,
Feb. 11, 1793.

I, BENJAMIN BISHOP, of No. 5, Hare-court, Temple, do certify, that being at Mr. Peter Smith's houſe, the greateſt part of laſt ſummer, for the benefit of my health, I had an opportunity of ſeeing his method of ſtall-feeding horſes.

BENJAMIN BISHOP.

Feb. 12, 1793.

SIR,

UPON the application of Mr. Smith, I went to meaſure a piece of land, ſown with rye, for feed; the contents of which were two roods and two perches; as alſo a piece of land ſown with tares, the contents of which were three acres two roods and twenty-ſeven perches.

Witneſs my hand,

JOHN THOMPSON.

Hornchurch,
Feb. 11, 1793.

Mr. MORE.

THIS is to certify, that I, James Garner, ſervant to Mr. Peter Smith, of Hornchurch, Eſſex, being his carter and ſole manager of his experiment of ſtall-feeding horſes, and having heard my ſaid maſter's account read, I do believe the ſame to be true.

JAMES GARNER,

Hornchurch,
Feb. 11, 1793.

TEN GUINEAS, part of the Premium offered for diſcovering the cauſe, and pointing out an effectual cure for the diſeaſe called the Curl in Potatoes, was this year adjudged to Mr. WILLIAM HOLLINS, of Berriew, in Montgomeryſhire; it appearing he had not entirely conformed to the terms of the Advertiſement, his method being rather a pretive than a cure of the malady. See other Papers on the ſame ſubject, by Mr. HOLLINS, Vol. VIII. page 18, and Vol. IX. page 52.

SIR,

I MUST deſire you to lay before the Society theſe additional remarks on the Curl in Potatoes, which are the reſult of experiments made ſince my laſt communication.

As ſome perſons, after the moſt careful management, may have ſome of their potatoes infected (the reaſon of which is ſhewn in page 61, Vol. IX.) and others are obliged to buy their ſeed in the market; I thought it would prove highly beneficial to the country, if there could be a method found to diſtinguiſh, in that caſe, the ſound from the unſound; but this was hard to determine, for the outward appearance gives no indication of the infection. I hope, however, that the following experiment, which I made in my own field, before the perſon who aſſiſted me to plant my potatoes, whoſe certificate I ſend herewith, and alſo one made in another perſon's garden, will, if properly attended to, effectually anſwer that purpoſe.

In cutting potatoes for ſets, care ſhould be taken not to cut them entirely through; but when the knife has penetrated to about the half, the other half ſhould be ſlived or broken off. By this operation you may underſtand whether the potatoe has proper vegetative power or not; if the knife enters eaſily, and the potatoe breaks off ſoft, then it is fit for ſeed; but if, on the contrary, the knife enters with ſome difficulty, and the potatoe breaks off harſh and rough, though it may not appear to want ſap, yet it is void of proper vegetative power, and unfit for ſeed; for if planted, it will either remain whole in the ground till dug, or produce a complete curled crop. However, if made uſe of as food, it will boil ſome minutes ſooner, and eat dryer and mealier than a ſound potatoe.

Regard ſhould always be had to the nature of the ſoil where potatoes are to be planted: wet heavy ſoil will ſtarve and rot them, in the ſame manner as it will ſcald and ſtarve any kind of grain, eſpecially in a wet ſeaſon; and alſo ſharp ebb ſoil, where there is not ſufficient mould to protect them from the ſcorching heat of the ſun, will dry up the vegetative power, in the ſame manner as it will cauſe any kind of grain to wither and die away, particularly in a hot ſeaſon.

Care ſhould alſo be taken not to plant them in unprepared ground and freſh manure; for I have found by repeated experiments, that freſh manure is a great detriment to the potatoe, when ſet in it; as in ſome kind of ſoil, and in ſome ſeaſons, it will cauſe even a ſound plant to curl in ſome degree; but ſhould the plant be in the leaſt unſound, the whole crop will be entirely curled, becauſe the heat of the manure dries up the vegetative power. Preparing the ground in time, likewiſe, will be a great means towards killing the weeds, which not only injure the potatoe much, but impoveriſh the ground alſo.

The beſt method of managing the ground, in my opinion, is the following: plough it in the beginning of January, and, in a month's time, or ſooner if the weather permits, harrow it, and manure it well on the ſurface, as you would for turneps;

then plough it in, and let it lie till the middle of April, by which time the froſt will have tempered the ground, and the manure will be rotted; then plough it acroſs and harrow it; and after that ridge it up, and plant your ſets, care always being taken that there is ſoil in the bottom of the furrow.—Thus you will not only inſure a good crop of ſound potatoes, but alſo have your ground much better prepared for wheat, than by ſummer fallowing. This I have frequently proved.

About three years ago, I had, from ſomewhat leſs than a chain acre of land, two hundred buſhels of potatoes (our buſhel is forty quarts), which, at two ſhillings a buſhel, the price of potatoes then, was worth twenty pounds. Here it muſt be obſerved, that a much larger crop might be raiſed, by earthing and manuring to the utmoſt, which may and ought to be done with potatoes intended for food only; but, as I always ſell the greateſt part of mine for ſeed, the whole was cultivated according to the directions given to raiſe ſeed potatoes, in my former papers. The potatoes were taken up in October, and wheat ſown on the ſame ground, with one ploughing only, and without any freſh manure, which produced thirty buſhels of clean corn. This, at eight ſhillings a buſhel, the average price of wheat then, was worth twelve pounds, which, added to the twenty pounds, the value of the potatoes, makes thirty-two pounds, the produce of leſs than an acre in ſeventeen months, from April, 1789, to September, 1790.

I beg leave to mention one other experiment made laſt year, which, though not applicable to the curl, yet may ſerve as a hint for others to do the ſame; for, from the ſucceſs I had, I have no doubt but it will be very profitable, if generally practiſed. After the rows of potatoes were covered, I ſet, with a ſtick, about ten quarts of beans along the middle of the rows: both grew up together very well, and came to perfection, without injuring each other in the leaſt. The beans grew ſtrong and upright, and the potatoes, as is uſual, bent a little to each ſide: the produce of the beans was two buſhels; they podded better than common, which I attribute to the diſtance they were ſet from each other.

The Society will remember that I ſaid in my laſt papers, that I ſhould not be ſurpriſed if there would be more curl potatoes this year, than there has been ſince the year 1786. The great and general complaints in this neighbourhood, and in other parts, prove that it was too true. I hope this will ſatisfy the Society, that what I advanced concerning the curl, &c. was not founded on extravagant conjectures and bold aſſertions, but on a thorough knowledge of the nature and cauſe of it.

I have been informed, by a native of America, that what we call the long red American potatoe, grows in that rich and newly-cleared ſoil to a very large ſize; but that the potatoes proceeding from the roots were never uſed as ſeed; for there ſprung from the ſtalk, very near the ſurface of the ground, ſmall potatoes as they called them; but, he ſaid, they were about the ſize of thoſe raiſed in England, and thoſe were always planted. I hope the Society will forgive my mentioning this, as it confirms what I have already ſaid, " That ſmall potatoes are beſt for ſeed.

I muſt beg leave to enumerate the principal cauſes from which the curl proceeds, and then conclude.

Firſt, From potatoes being forced by cultivation to overgrow their power for vegetation.

Secondly, From their vegetative power being dried up in ebb ſoil by the ſcorching heat of the ſun; and,

Thirdly, From their being expoſed too long, after they are cut into ſets, before they are planted.

Now, I am confident, that I have pointed out the cauſe and cure of the Curl; and I will be bold to ſay, that the directions I have given, if carefully followed, will be crowned with ſucceſs; and I perſuade myſelf, that no one, who has paid a proper attention to the ſubject, will diſagree with me. This may appear bold, ſound too much of egotiſm; yet I flatter myſelf, that I ſhall be forgiven, when it is conſidered, that I advanced facts, verified by repeated experiments, and not mere conjectures; and that I am endeavouring to eſtabliſh a mode of cultivating that moſt uſeful root, which, if practiſed, will prove of infinite benefit to the public.

With great deference and reſpect,

I remain, Sir,

Your moſt humble ſervant,

William Hollins.

Berriew,
Nov. 19, 1792.

Mr. More.

THIS is to certify; that I, John Bullock, aſſiſted Mr. Hollins to plant his laſt crop of potatoes, and was eye-witneſs to the cutting of the ſets, when he ſhewed me the difference between the ſound and unſound plant. The potatoes were taken promiſcuouſly from the heap; and thoſe that proved, in the cutting, to be unſound, were thrown on one ſide, and planted by themſelves, in the end of a row, and a ſtake driven into the ground for a particular mark. I aſſiſted Mr. Hollins alſo to dig up his potatoes, and ſaw that the unſound plants, quite to the mark, were completely curled, and not one kind amongſt them: but the whole crop, except the above-mentioned part, were kind, and produced a good crop; as witneſs my hand, this 9th day of November, 1792,

JOHN BULLOCK.

SIR,

HAVING had ſome converſation laſt year with Mr. Hollins, about the curl potatoe, he told me, among other things, that he expected there would be more curled crops this year than has been ſince the year 1786; and I find, he ſaid the ſame in his papers to the Society laſt year. I own, that I thought his aſſertion rather bold, which induced me to pay particular attention to that ſubject; and I found, to my ſurpriſe, that he was perfectly right. The complaints of the Curl is univerſal in theſe parts; it has extended its pernicious effects to the more hilly part of this country, where it was hardly known before, even by name; and the potatoes, in conſequence of it, in a great meaſure, (though there are a few inſtances of their being rotted in the ground) are become very dear already.

This appears to me a clear proof of his thorough knowledge of the nature of that diſeaſe. What confirms my opinion is, that his own crop this year, and the crops of thoſe that bought their ſeed of him, ſeveral of whom I know, were quite free from that diſeaſe. I do not know any body in this neighbourhood that cultivated their potatoes according to his directions: ſome are ſo opinionated, that they will not allow him to know more than themſelves; others think they cannot raiſe more than half the crop by following his mode, not conſidering that he directs but a ſmall portion of their potatoe-ground, only as much as they intend for ſeed, to be cultivated in that particular manner. However, I have no doubt, but a few repeated mis-crops will conquer the moſt obſtinate prejudice; and that Mr. Hollins's mode, from the ſucceſs that attends it, will, in a few years, become univerſal.

Should any thing here advanced, any way further the intention of the Society, it would be eſteemed a happy circumſtance by him who is the Society's and

Your moſt humble ſervant,

ROBERT WILLIAMS,

Miniſter of Berriew.

Berriew,
Nov. 17, 1792.

The Gold Medal, being the Premium offered for feeding Cattle and Sheep with Potatoes, was this year adjudged to William Barbor, Eſq. of Fremington, near Barnſtaple, Devonſhire; from whom the following Papers were received.

My Lords and Gentlemen,

SEEING, in the news-paper, that you give premiums for the encouragement of agriculture, I beg leave to become a candidate for the medal that will be given for tilling the greateſt quantity of potatoes for feeding cattle.

In 1791, I planted twenty-four acres for that purpoſe, in two fields, as named in the certificate, which is ſigned by, and well known to, the clergyman and churchwardens of this pariſh. I will ſtate to you an account how they were tilled, and the expence of it, as exact as poſſible. I had them planted after three different methods, and three different manures, viz. dung, cob or mud walls, and rotten ſtraw: the produce of one acre manured with dung, was two hundred and fifty-five ten-peck bags; cob or mud walls, one hundred and twenty-eight ten-peck bags; rotten ſtraw, one hundred and two ten-peck bags. The whole was ploughed twice: the firſt method, I had the trenches cleaned out by men with ſhovels, which I found expenſive: the ſecond, I uſed a beat-rake, with a board placed at the bottom; a man, boy, and horſe, can clean out three acres per day, and anſwer as well as the former; by which method I planted the whole, except two acres: the third I ploughed in, which I diſapprove of; therefore planted only one acre in that manner. I have ſtated a full and particular expence of one acre planted according to the three different methods, manured with dung, as follows:

Firſt

Firſt Method.	£.	s.	d.	*Second Method.*	£.	s.	d.	*Third Method.*	£.	s.	d.
Ploughing twice	0	9	0	Ploughing twice	0	9	0	Ploughing twice	0	9	0
Dragging - -	0	1	3	Dragging - -	0	1	3	Dragging - -	0	1	3
Cleaning out the ridges with ſhovels - -	0	4	0	Cleaning out the ridges with beat-rakes -	0	0	10	Ploughing under furrow -	0	5	0
100 horſe-load of dung, at 3d.	1	5	0	Dung - -	1	5	0	Dung - -	1	5	0
Spreading dung	0	1	6	Spreading dung	0	1	6	Spreading dung	0	1	6
Planting potatoes	0	1	0	Planting potatoes	0	1	0	Planting potatoes	0	1	0
Healing - -	0	4	0	Healing - -	0	4	0	Healing - -	0	4	0
Ten bags and a half of potatoes, at 1s. 8d.	0	17	6	Potatoes - -	0	17	6	Potatoes - -	0	17	6
Cutting - -	0	1	0	Cutting - -	0	1	0	Cutting - -	0	1	0
Second healing	0	3	0	Second healing	0	3	0	Second healing	0	2	6
	£.3	7	3		£.3	4	1		£.3	7	9

On twenty acres of theſe potatoes, I fed fifty-ſix bullocks: the other four acres I gave, cut in ſlices, as fodder for young cattle; which I found to anſwer beyond my expectation, and would recommend to all breeders. The cattle I bought in very lean, being determined to feed them entirely on potatoes. The food being too ſtrong for them, in the firſt place, made them ſcour for about three weeks, of courſe did not get much; but after it ſtopped, they throve very well: thoſe that were in a better ſtate, the food had not that effect on; and I would recommend all thoſe that feed cattle on potatoes, to buy them in as near half fat as poſſible, which will pay double to thoſe bought in lean. I tried ſheep; but the weather had been ſo wet for two or three ſeaſons before, that I had ſcarce a ſound ſheep in my flock; and of courſe it did not anſwer.

I planted three different ſorts of potatoes, the white and red Iriſh, and the white yam. I found no difference in the goodneſs as to the feed; but the white yam produced between fifty and ſixty bags more on an acre; and the white yam being ſo much larger, there is not that danger of the bullocks being choaked. Bullocks fed on potatoes, I found to be ſubject to two maladies, viz. ſwelling, and being choaked. There is no danger in either, if paid attention to in time: their ſwelling is eaſily got rid of, by driving them about the yard; and the potatoe in their throat may be got down by a ſmooth ſtick. The expence of taking up an acre of potatoes is about one pound ſix ſhillings: that acre ploughed under furrow was red Iriſh, and produced only eighty-three ten-peck bags. I attempted to plough them up again, but was obliged to dig them over again. The fields being in turneps, the year before, there was no expence in weeding.

I ſhould have charged only half the dung to the potatoes, as my ground was in excellent order for wheat, and had a better crop than has ever been ſeen in this neighbourhood.

bourhood. I will trouble you no further; but remain,

My Lords and Gentlemen,

Your obedient humble ſervant,

WILLIAM BARBOR.

Fremington,
Oct. 27, 1792.

THIS is to certify, that the above is true, as it was carried into execution by me, under Mr. Barbor's directions.

ROBERT SQUIRE.

THESE are to certify, that Mr. Barbor, of Fremington, in the county of Devon, did plant, in the year 1791, the Barn-park and North-eaſt Chill-park, meaſuring about twenty-four acres, both in the ſaid pariſh, with potatoes, and fed fifty-ſix bullocks.

SAMUEL COOKE, Vicar of Fremington.

JOHN BLACKMORE, } Churchwardens.
HUGH SLOLEY, }

THIS is to certify, that a field, known by the name of Barn-park, the property of Mr. Barbor, of Fremington, in the county of Devon, and in which field potates are now growing, for the purpoſe of feeding cattle and ſheep, meaſures nineteen acres three roods and thirty-two perches; and alſo that another field, known by the name of North-eaſt Chill-park, the property alſo of the ſaid Mr. Barbor, on the ſame eſtate, and on which potatoes are now alſo growing, for the purpoſe of feeding cattle and ſheep, alſo meaſures four acres and ſixteen perches.

JOHN TAMLYN, of Barnſtaple,
Surveyor.

Fremington, near Barnſtaple,
Oct. 19. 1792.

SIR,

LOOKING over the advertiſement, after I had ſent away my laſt letter, I thought I had not been ſo explicit as I ought, as to the ſucceſs that attended my bullocks feeding on potatoes: ſo will trouble you once more with an account of what the bullocks coſt me, and the profit I made on them.

I bought in fifty-ſix bullocks for three hundred and eighty pounds eighteen ſhillings, and ſold them for five hundred and eighty pounds eighteen ſhillings; which was a clear profit of two hundred pounds, as the dung will more than pay for ſtraw and labour. Each bullock, on an average, eat three pecks of potatoes a day; which, at the rate they then ſold for, was two ſhillings and ſix-pence per week. I know of no other particulars; ſo remain,

SIR,

Your humble ſervant,

WILLIAM BARBOR.

Fremington,
Oct. 29, 1792.

Mr. MORE.

The Committee of Agriculture having thought proper to tranſmit the following Queſtions to Mr. Barbor—

" How long the cattle were fed on the potatoes ?

" Whether the cattle were ſold to the butcher immediately from the potatoes ?

" Whether any, or what quantity of hay or ſtraw, or any other food, he ſuppoſes was given the cattle duriug the time they were fed with potatoes ?

The ſubſequent letter was received from him in anſwer thereto.

SIR,

I RECEIVED the favour of yours, and will anſwer your queſtions as clear as poſſible. The firſt, as to the time they were feeding on potatoes ? I anſwer—I put the bullocks in feeding the 10th of December: moſt of them were fit for the butcher by the 1ſt of March, when I had a ſurvey; but the number being too great for the conſumption of the country, I did not ſell many that day: I ſold them afterwards, as purchaſers offered: they were all gone by the 4th of May, except four, which did not go off till the latter end of the month. The ſecond queſtion, Whether they were ſold to the butcher or not? I anſwer—they were, all, except three, which were ſold to a jobber, and the greateſt part killed immediately from my ſtalls. The third, as to the quantity of hay or ſtraw? I anſwer—For the firſt week I gave them hay, which, I thought, would prove expenſive, and not pay; ſo I tried ſtraw, which I found to anſwer full as well, as the bullocks eat the potatoes better. The quantity of ſtraw I kept no account of, but am certain the dung paid for all.

I remain, SIR,

Your humble ſervant,

WILLIAM BARBOR.

Fremington,
Dec. 1, 1792.

Mr. MORE.

The Premium having been this year adjudged to WILLIAM BARBOR, Eſq. in conſideration of his having cultivated the greateſt quantity of Land with Potatoes, for the purpoſe of feeding Cattle and Sheep (ſee the foregoing Papers); the following Letter from Mr. JAMES BUCKNELL, to whom the Premium for feeding Cattle and Sheep with Potatoes was adjudged, in the year 1790 (ſee Vol. IX, p. 45), having been alſo received; the SILVER MEDAL was voted to him for the Communication.

SIR,

IN the laſt year, 1791, I cultivated ſixteen acres and three roods of land with potatoes, for the ſole purpoſe of feeding cattle and ſheep; and which I applied in the following manner. Being lately come much into the breeding of cattle, I gave a great part of the potatoes to young cattle, ſuch as yearlings, two-years old, &c.: but, however, I fed, for the butcher, eleven heifers and twelve oxen laſt year, chiefly on potatoes, only giving them ſometimes a little hay and oat-ſtraw. I gave about a buſhel of potatoes a day (which is four pecks, Wincheſter meaſure) to each heifer or ox, and altered the quantity, as I found it neceſſary to give them more hay or ſtraw: to the younger cattle, which were about ſeventy, I gave a leſs quantity, according to their different ages, with a larger proportion of hay and ſtraw. The manner of giving the potatoes to the cattle differs nothing from what I have deſcribed, and tranſmitted to the Society, in a former Paper, and which is inſerted in the ninth volume of their Tranſactions: but during laſt winter, eſpecially in bad weather, I gave a conſiderable quantity to my ewes, which conſiſted of about ſix ſcore in number, giving ſometimes a bag of potatoes, containing twelve pecks Wincheſter meaſure, to a ſcore of ewes, in a day; which are carried out, and thrown abroad, on the ſurface of the paſture-land. The ewes, after having been uſed to this manner of feeding two or three days, will immediately gather round the perſon who carries them out, and eat the potatoes with great eagerneſs. As to the ſucceſs attending this branch of agriculture, I can only ſay in general, and that, I think, from ſufficient experience, that I have been able to keep a larger number of cattle and ſheep, and that in a more thriving ſtate, than by any other means that I have tried.

The manner of cultivating this uſeful and valuable root, for the purpoſes aforeſaid, which I now uſe, as ſuperior to all other methods that I have practiſed or known, is by ploughing them in, in the following manner: having made the land to a good fallow, and dung for manure brought and ſpread upon ſuch part of the ſame as is immediately intended for potatoes,—when the firſt furrow is ploughed, ſome of the labourers drop the potatoes, firſt cut in pieces, in the bottom thereof; and others, with rakes, in which are ſhort iron teeth, rake the dung, that is near the edge of the furrow, into the ſame, upon the potatoes. I then have two furrows more ploughed, without dropping any potatoes therein; and then, in the next, drop potatoes, and rake in the dung upon them, as before; and thus continue in the ſame manner; ſo that the potatoes are placed in every third furrow, and all lie under the dung; and the dung is got into ſuch furrows only as the potatoes are dropped in. A man and boy, and two horſes, will thus plough an acre in one day; and ſix labourers, which may moſt of them be women or boys, will drop the potatoes, and manage the dung for the ſame quantity of land, in a day, without their ſtopping for the plough, or the plough for them.

I thus let the potatoes remain about a month; at which time they generally begin to appear above ground, growing up in green ranks, about two feet aſunder: I then, with another plough, which muſt be made different from that uſed at firſt, becauſe it muſt throw up the earth on both ſides of it; with this plough and two horſes, I order a man to go between the two furrows, in which no potatoes were dropped, which is between the ranks; and this throws up the earth over the potatoes, on both ſides, and ſerves for a ſecond covering, and at the ſame time deſtroys the weeds. This being done, they remain to grow, and are little hurt by weeds, till fit to be taken up for uſe. A man and boy, and two horſes, with this plough, will perform, for this ſecond covering, three acres in a day.

The whole expence of tilling an acre of potatoes, in this manner, from the firſt breaking up the ground, including dung for manure, potatoes for ſeed, and labour, amounts to about five pounds. Should any thing I have here written, merit the further attention of ſo reſpectable a Society, and promote the improvement of agriculture, I ſhall at all times be ready to communicate any future obſervations relative thereto; and am, with great reſpect,

SIR,

Your moſt obedient humble ſervant,

JAMES BUCKNELL.

Knowſtone, near Tiverton, Devon,
Nov. 9, 1792.

Mr. MORE.

THIS is to certify, that I meaſured for Mr. James Bucknell, of Knowſtone, a quantity of land, containing ſixteen acres and three roods ſtatute meaſure; in all which land potatoes were cultivated in the year 1791; and, being an inhabitant of the ſame pariſh, have the greateſt reaſon to believe they were ſolely applied to the purpoſe of feeding cattle and ſheep; as witneſs my hand,

GEORGE TARR, Surveyor.

WE, the underſigned, having read Mr. Bucknell's account of his cultivation of potatoes, for the purpoſe of feeding cattle and ſheep, being perſons dwelling near him, do hereby certify, that we believe the ſame to be ſtrictly true; as witneſs our hands,

T. Froude, Vicar of Knowſtone.
S. Fisher, Churchwarden.

The SILVER MEDAL and TEN GUINEAS, being the Premium offered for the beſt account of the utility and advantage of the drill, or broad-caſt method, in the culture of turneps, was this year adjudged to Mr. Peter Smith, of Hornchurch, in conſequence of the following account, received from him on that ſubject.

SIR,

I DO myſelf the pleaſure of ſending you an account of an experiment I made, to determine the comparative advantage of the drill and broad-caſt method of cultivating turneps, made on a field of ſix acres, a mixed ſoil or gravelly loam; which I beg you will lay before the Society for the Encouragement of Arts, Manufactures, and Commerce.

In Auguſt, 1791, the field produced me a crop of rye, which, immediately after harveſt, was ploughed: in October, it was twice ploughed and three times harrowed.

On the 2d and 3d of November, it was ſown with early peas, to pod for London market, which were all gathered in June, 1792; and, in July, the land was made a perfect clean fallow, by three times ploughing, four times harrowing, and once rolling. Auguſt the 6th, 1792, the field was equally divided and ſown, half with Mr. Cooke's drill, and half broad-caſt; the drill with one point of ſeed per acre, at one foot apart; the broad-caſt, one quart per acre.

By ſcarifying thoſe drilled turneps, when they had their four leaves, they became the ſooneſt ready to ſet out by the hand-hoe, which was done at three ſhillings per acre; the ſcarifying, eight-pence per acre; the hand-hoeing broad-caſt, ſix ſhillings per acre. The expence of labour ſaved by the drill is, therefore, two ſhillings and fourpence per acre; the drill turneps the largeſt plants, and the land in the beſt tilth.

On the 4th of January, 1793, I had four roods of the drilled turneps, and four of the broad-caſt, weighed, under my direction and ſuperintendance, and in the preſence of the Vicar of the pariſh, whoſe certificate is annexed. In the ſame manner, on February the 18th, I meaſured two other roods of the drilled, and two of the broad-caſt, both parcels of which were weighed with the greateſt accuracy; and the product of each reſpective meaſurement and weight, was as follows:

Drill.	*Cwt.*	*Q.*	*lb.*
January 4, No. 1. -	5	2	21
2. -	5	2	0
February 18, - -	5	0	14
Total, ſix roods drilled	16	1	7

Broad-caſt.	*Cwt.*	*Q.*	*lb.*
January 4, No. 1, -	4	3	27
2, -	4	3	2
February 18, - -	4	3	8
Total, ſix roods broad-caſt	14	2	9

	Ton.	*Cwt.*	*Q.*	*lb.*
Average per acre drilled	21	15	0	0
Average per acre broad-caſt	19	8		63
Advantage in favour of the drill, per acre	2	6	0	22

Having large crops of turneps this year, I ſold two acres, at five pounds ten ſhillings per acre.

	£.	*s.*	*d.*
The drilled turneps have the preference at the above value, per acre,	0	13	0¾
Expence ſaved in hoeing	0	2	4
In favour of the drill, per acre	0	15	4¾
In favour of three acres drilled	£.2	6	2¼

I have drilled all my wheat but ſeven acres, and that for experiments, the whole being fifty acres; I have likewiſe drilled my tares, peas, and lent corn, all experimentally, which, I hope, will give me an opportunity to make ſome experiments, that I may have the pleaſure to lay before the Society.

I am, SIR,

Your humble Servant,

PETER SMITH.

Hornchurch, Eſſex,
April 15, 1793.

Mr. MORE.

THIS is to certify, that in Auguſt 1792, I meaſured a field of Mr. Peter Smith's, at Hornchurch, Eſſex, containing ſix acres, and divided the ſame into two equal pieces, of three acres each.

And, on the 4th of January, 1793, I, in the preſence of the Vicar of the ſaid pariſh, meaſured off two roods of drilled turneps, and two roods of broad-caſt; and, in another part of the ſaid field, meaſured off too roods more of each, in order for the ſame to be weighed, which was done in my preſence. Alſo, on the 18th of February, 1793, I meaſured off, in preſence of the ſaid perſon, two roods more of drilled, and two roods of broad-caſt turneps, for the above purpoſe of weighing, which I alſo ſaw weighed.

Witneſs my hand, this 15th of April, 1793.

JOHN THOMPSON.

Hornchurch, Eſſex.

THIS is to certify, that on the 4th of January, 1793, I attended at Mr. Peter Smith's farm, in this pariſh, and ſaw two roods of drilled turneps, and two roods of the ſame broad-caſt, meaſured off; and, on the ſame day, in another part of the field, ſaw two other roods of drilled and broad caſt turneps meaſured. All theſe parcels were ſeparately weighed in my preſence; and the amount was as beneath.

	Cwt.	*Q.*	*lb.*
Firſt meaſurement, drilled, two roods,	5	2	21
Second meaſure	5	2	0
	11	0	21

	Cwt.	*Q.*	*lb.*
Firſt meaſurement, broad-caſt, two roods,	4	3	27
Second meaſurement	4	3	2
	9	3	1

On the 18th of February, 1793, I again ſaw two roods of drilled, and two roods of broad-caſt turneps, meaſured and weighed in the ſame field as before, the reſult of which was as follows:

Drilled

Drilled turneps.			Broad-caſt turneps.		
Cwt.	*Q.*	*lb.*	*Cwt.*	*Q.*	*lb.*
5	2	14	4	3	8

W. H. Reynall,
Vicar of Hornchurch.

April 19, 1793.

I, JAMES GARNER, ſervant to Mr. P. Smith, did ſow, ſcarify, and weigh the above turneps; as witneſs my hand,

James Garner.

Hornchurch, Eſſex,
Feb. 15, 1793.

The GOLD MEDAL, being the Premium offered for the Culture of Rhubarb, was this year adjudged to Mr. THOMAS JONES, from whom the following Papers were received.

SIR,

BY laying before the Society the encloſed certificate, you will very much oblige me; and, if you are of opinion that the communications which accompany it, are of ſufficient importance, you will flatter me extremely by ſubmitting them to their conſideration.

I have for ſeveral years entertained an idea, that Rhubarb may be cultivated in this Iſland, to very great advantage, provided we could aſcertain the ſoil which was moſt congenial to it, and would afford it age. This idea was confirmed, upon being put in poſſeſſion of a root, which was the produce of a garden in Enfield; the ſoil a ſtiff loam, lightened with rotten ſaw-duſt: but, whether from age or the moiſture of the ſituation, I cannot determine, it was unfortunately nearly all decayed: I ſay unfortunately, having never been capable of procuring another, in order to carry on my experiments further as to its cure, which certainly is of equal importance with its cultivation; but, notwithſtanding I met, as I have juſt obſerved, with ſufficient information to confirm me in my opinion, the ſounder parts were of a very ſuperior quality; indeed, it equalled any Ruſſia Rhubarb I ever ſaw, and exceeded, by many degrees, the imports of the preſent day. Its effects I have had repeated opportunities of proving, through the favours of ſome medical friends in the country, of the greateſt reſpectability; and I was happy to find it anſwered every expectation.

I have diſpoſed of the whole, excepting two or three ounces of the ſmalleſt pieces; and I have the pleaſure to inform you it continues free from the worm, which is its greateſt enemy; and has, in a great degree, retained its original beauty, though it is nearly two years ſince it was cured.

Theſe circumſtances, and the hope of being honoured with the Gold Medal of the Society, determined me to become a planter; and I obtained a piece of ground in the neighbourhood as ſoon as I was able. The ſoil, in ſome places, is loam entirely; in others, loam mixed with gravel; but, in general, rich and light. It had been laid down with graſs for many years; and to prepare it for my purpoſe, I had it ploughed, and ſowed it with turneps: wherever I intended to plant a root, that ſpot was dug about three ſpit deep, and the ſurrounding earth heaped upon it to a conſiderable height, forming a diſtinct hill for every plant. I was induced to adopt this plan, for ſeveral reaſons : it is eſſentially neceſſary to the cultivating Rhubarb properly, that, in the firſt inſtance, it ſhould have a great depth to penetrate, and that it may afterwards enlarge: the earth about it ſhould be light, and continue to be kept ſo.

It is amazing to obſerve with what ſurpriſing rapidity it will grow, if it meets with theſe advantages. I ſpeak from experience. A root produced from a ſeed ſown in June, 1791, was tranſplanted into my garden, and upon one of theſe hills, in April, 1792. In the courſe of the ſummer it diſplayed palmated leaves, which, I obſerve, is ſeldom the caſe in their firſt ſeaſon, which meaſured four feet from one point to the other in breadth, and three in length. By its remaining ſo ſteady, and reſiſting, contrary to all my expectations, conſidering the ſize of its leaves, every inclemency of the weather, I was led to conclude its progreſs below had kept pace with that above; and I was not diſappointed,

pointed, upon examining in the autumn. When it was planted, the tap-root meaſured no more than ſeven inches; in ſix months, its growth extended, to what I cannot exactly ſay; I traced it three feet, and would have carried my reſearches further, but was diſſuaded by my gardener, from an apprehenſion it might injure the plant.

It may be aſked, Where is the neceſſity of elevating your plant ſo much above the ſurface of the ground? Why not dig a deep hole, as is the preſent practice, and if the ſurrounding earth muſt be ſo very light, let that occaſionally be dug likewiſe? My anſwer is, that, in digging round the roots, the beſt ſhoots may be endangered from the ſpade, ſhould they happen to lie acroſs; for, when planted upon a ſurface, and particularly in very rich ground, they do not all ſtrike directly down. But the moſt material objection to this method ſeems to me to be this—the inconvenience ariſing from too large a quantity of moiſture. This root is naturally very ſucculent, and, of conſequence, liable to decay, particularly from two cauſes, froſt and moiſture: there is juſt as much neceſſity to guard againſt the one, by not expoſing it too much, as againſt the other, by giving it too low a ſituation.

If the different ſpots, deſigned for each plant, are dug into holes, and the ſurrounding earth occaſionally lightened to the ſame depth, it will be capable of retaining a much larger proportion of moiſture than is neceſſary, to the certain detriment of the plantation, without a poſſibility of its eſcaping. Such is the natural growth of this plant, that of itſelf, if not carefully provided againſt, it will aſſiſt in its own deſtruction, from the cauſe which I am treating of. The foliage is ſo very extenſive, that it collects the rain from a conſiderable diſtance around; and ſuch is the poſition of almoſt every leaf, it is conveyed directly to the crown, which, of all others, is that part of the plant the moſt ſuſceptible of decay. How then is this ſuperabundant moiſture to be got rid of? Will it not be taken up by the ſun? Certainly not; for the foliage which continues all the time the ſun has any influence worth mentioning, entirely prevents its penetration, even to the ſurface of the ground. The original diſpoſition of it, therefore, muſt be, I conceive, the only preventive on which any dependence can be had againſt this inconvenience.

Hitherto, all that I have ſaid has relation to a plant of one or two years old. I ſhall moſtly confine myſelf in what I have further to add, to its production and tranſplanting. I am inclined to believe, that many of the loſſes which I at firſt ſuſtained were, in a great degree, owing to the common evil, ariſing from ground newly broken up, ſuch as the wire-worm, called ſo by the gardeners from its ſhape and hardneſs. I cannot help obſerving here, that this is the moſt deſtructive enemy we have: if one is in the hill, it is ſure to prove ſo; the inſect inſinuates itſelf into the crown of the plant, which it entirely devours; and the root, if not a ſharer in the ſame fate, falls gradually to decay, beginning generally at the lower extremity.

In April, 1792, I procured ſome freſh dung, of which I made a thin layer: over this I ſifted ſome fine mould, to the thickneſs of a foot, and, over the whole, placed a large melon-frame with a pair of lights. It was cloſed for a few days, that the mould might be tolerably warmed; and the ſeed was then ſowed moderately thick. Attention muſt be paid to the temperature of the bed; for if, on the one hand, it is too cold, the greateſt part of the ſeed will not vegetate at all; and if, on the other, it is too hot, the plants, by being forced, will become weakly, and perhaps good for nothing. I began to tranſplant almoſt from their firſt appearance, and now and then ſaved one; but the loſs was ſo exceſſive, as to prove this ſtage not to be the proper one. However, for the ſake of experience,

perience, I continued planting all through the ſummer, though to very little purpoſe. In the fourth week in September, I made my laſt experiment, and ſaved one hundred and twenty-ſeven plants, out of one hundred and thirty.

I attributed the ſucceſs which attended me here, not altogether to the ſeaſon of the year, but, in ſome degree, to the ſize of the plants, and the conſequent increaſe of their fibres, through whoſe means they derive their nouriſhment. I am led to form this concluſion from another experiment, which I made in the month of April laſt, upon ſeventeen plants of about ten months old: from the ſhallowneſs of their ſeed-bed, their roots were very fibrous, and irregular: four of theſe I tranſplanted exactly as they were taken up; the remaining thirteen I endeavoured to train to two or three ſhoots, by depriving them of the greateſt number of their fibres and irregularities. Though the ſame care was taken of them all, and planted by the ſame perſon, three out of the four grew, in the courſe of the ſummer, to be fine flouriſhing plants; but the thirteen were every one of them loſt; not, I am aſſured, from inſects, but, as I have no doubt, from their being deprived, as I have juſt now obſerved, of the means through which they receive their nutriment.

From all that has been ſaid, we may draw the following concluſions: That the ſeaſon for ſowing is the ſpring, about March or April, or, in autumn, about Auguſt and September; that thoſe plants which are raiſed in the ſpring, ſhould be tranſplanted in autumn, and *vice verſâ*; That they cannot have too much room; That room and time are eſſentially neceſſary to their being large, of a good appearance, and, as I imagine, the increaſe of their purgative qualities; That, to effect theſe purpoſes, the ſoil muſt be light, loamy, and rich, but not too much ſo, leſt the roots ſhould be too fibrous; That their ſituation can ſcarcely be too dry, as more evils are to be expected from a ſuperabundancy of moiſture, than any actual want of it: and laſtly, we may conclude, That, in particular, the injuries which they are ſubject to, are principally during their infancy, and to be imputed to inſects, and inattention to the planting ſeaſon; afterwards, from too great an expoſure to froſt: but that none can be dreaded from heat; and that, in general, they are hardy, and eaſy of cultivation, when arrived beyond a certain term.

Next ſummer, I purpoſe continuing my experiments and obſervations; and it will afford me great ſatisfaction, if in any, the ſmalleſt degree, I may tend to elucidate a ſubject ſo likely to become of conſiderable national importance: but ſhould I be ſo fortunate as to ſucceed in this humble attempt at obtaining the honourable approbation of the Society, which ſeems actuated only by motives the moſt glorious and praiſeworthy,

worthy, it will be a diſtinction which I muſt conſider as unmerited on my part, but never to be eraſed from my memory.

I am, SIR,

Your moſt obedient humble ſervant,

THOMAS JONES.

No. 13, *Fiſh-ſtreet Hill,*
London.

Mr. MORE.

THIS is to certify, that Joel Rowſell, of the pariſh of Endfield, in the county of Middleſex, gardener, has planted for Mr. Thomas Jones, of Fiſh-ſtreet Hill, London, four hundred and twenty plants of the Rheum Palmatum, or true Rhubarb, at ſix feet diſtance from each other, in a piece of ground rented of me, by the ſaid

Mr. Jones, ſituated at Four-Tree Hill, in the pariſh aforeſaid; and that there is every proſpect of their ſucceeding.

WILLIAM SHAW,

Four-Tree Hill, Endſield,
Feb. 16, 1793.

Signed by
the Rev. Mr. SHAW,
in preſence of
S. T. BORMAN.

The following Papers, with ſome Samples, ſent in claim of the Premium for curing Rhubarb, having been received, it appeared, that, although the Candidate had ſent in Samples, to the amount of Five Pounds, agreeably to the terms of the Advertiſement, yet it being required that the Samples ſhould be equal to what is ſold in the ſhops under the name of Turkey or Ruſſia Rhubarb; and they being made up of various kinds, ſome of which are not in a ſaleable ſtate; he was not adjudged entitled to the Premium offered: but, as ſome of the Samples were ſuperior in quality, and better cured, than any hitherto produced, the SILVER MEDAL was voted to the Candidate, Mr. THOMAS HALLEY, of Pontefract, Yorkſhire.

SIR,

WITH the annexed certificate, I tranſmit five pounds of true Rhubarb, in various ſamples, for the conſideration of the Society for the Encouragement of Arts, Manufactures, and Commerce, in compliance to their rules. I alſo now proceed to the method taken in curing them.

It is, I believe, from twenty to thirty years ago, that my father firſt procured the ſeed of Turkey Rhubarb, from a medical gentleman of this town: ſince which time he had, at intervals, raiſed, cultivated, and cured, the roots, in pretty large quantities. During the laſt war with France, &c. he diſpoſed of it exceeding freely; but, ſince that period, the wholeſale druggiſts have procured it from abroad, at a lower rate than we could afford to ſupply them.

He tried a variety of ways, for the purpoſe of obtaining a proper knowledge of the method of cure, ſuch as waſhing the roots, bruſhing, barking, and peeling them; drying them in the ſun, on a kiln, in a ſtove, and in a warm kitchen: but having lately had the irreparable misfortune to loſe him, early in life, it is not in my power to lay perfectly before the Society the reſult of thoſe experiments.

In a diſſertation on Rhubarb, by Dr. Tirruogel, of Stockholm, the following method is propoſed:—"No roots ſhould be taken up till they have been planted ten years: they ſhould be taken out of the ground either in winter, before the froſt ſets in, or in the beginning of ſpring, and immediately cut into pieces, and carefully barked; let them be ſpread upon a table for three or four days, and be frequently turned, that the juices may thicken or condenſe within the roots. After this proceſs, make a hole in each piece, and put a thread through it; by which let them hang ſeparately, either within doors, or in ſome ſheltered ſhady ſhed. Some perſons dry them in a different way: they encloſe the roots in clay, and make a hole in the clay, about the thickneſs of a gooſe-quill, and in this manner hang up each piece to dry, ſeparately,

rately, that the moiſture may not evaporate, nor the ſtrength of the root be weakened. But the methods which the Tartars follow, is a bad one: they dig the roots out of the deſerts where they grow, bark them, and immediately ſtring them, and hang them round the necks of their camels, that they may dry as they travel; but this greatly leſſens the medicinal virtue of the root."

The Society muſt be well acquainted with the method of waſhing, barking, &c. recommended by Sir William Fordyce, in his late treatiſe; in which he alſo informs of the manner of ſcooping it, uſed by the Mongals, as obſerved by Mr. Bell. Dr. White, in his "Analyſis of the New London Pharmacopœia," mentions an inferior ſort of Rhubarb, which is imported from the Eaſt Indies, in long, flinty, firm, pieces, with a hole in the middle of each; but that "The beſt ſort of Rhubarb is brought from Turkey and Ruſſia, in light round pieces, with a hole in the middle of each: it is, externally, yellow; and, internally, variegated with reddiſh and yellow ſtreaks.

The roots I now ſend, were, I believe, planted about the year 1781, in a light ſandyiſh ſoil; but, from attention requiſite to more intereſting affairs, were, I underſtand, much neglected. They were taken up laſt ſpring; and, being thoroughly diveſted of the adhering earth, were placed for ſome weeks on the floor of a cool warehouſe: the fibres were then taken off, cut up, and dried on the flue of a green-houſe; but, from miſmanagement in my abſence, were entirely ſpoiled. The prime roots (of which the ſamples No. 2 and 5 are parts) were ſevered in ſmall pieces, peeled clean, and thoroughly cleared of every particle of unſoundneſs. Part was ſeparately laid in ſieves, and the remainder perforated, ſtrung, and ſuſpended in feſtoons from the cieling of a warm kitchen. How they have ſucceeded, the Society will be able to judge, from the fair ſample laid before them.*

them.* The manner of dreſſing conſiſts in paring off the external coat with a ſharp knife, as thin and clean as poſſible, and then finiſhing it off by a piece of fiſh-ſkin, with its own powder; which powder may be procured from the chips and ſmall pieces, either by grinding or pounding it in a large mortar.

Of the ſamples ſent,

No. 1 are ſuch roots as have failed in the drying.

No. 2, What have ſucceeded; but in an undreſſed ſtate (as per certificate).

No. 3, The chips or ſhavings which are neceſſarily taken from the above.

No. 4, The powder made from thoſe ſhavings.

No. 5, The root in its cured and finiſhed ſtate for ſale, of which a ſpecimen is reſerved in the Society's collection, for the inſpection of the public.

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* Theſe ſamples appear to be ſuperior to any Rhubarb hitherto cured in England, and produced to the Society.

Part of the roots in queſtion having been planted, when I was engaged in ſcholaſtic purſuits, I am not enabled to be ſo particular as I could wiſh on that head.

The enſuing ſpring it is my intention to plant a quantity, in a ſoil which has a very long time been famous for producing the beſt liquorice; and which, having an affinity in its growth to Rhubarb, I flatter myſelf will ſucceed in a proportionate degree. The Society may rely on a knowledge of all particulars at a proper time, and hope they will be ſuch as to merit their deſirable approbation.

I am, Sir,

Your much obliged ſervant,

Thomas Halley.

Pontefract, Yorkſhire,
Oct. 18, 1792.

Mr. More.

THIS is to certify, that Mr. Thomas Halley, of Pontefract, is in poſſeſſion of ſeventy-three pounds of Rheum Palmatum, or true Rhubarb, as per ſamples 2 and 5, being of the growth of his late father and himſelf, and of his own cure: as witneſs our hands,

THOMAS OXLEY, Apothecary.
WILLIAM TOMLINSON, Grocer.

WILLIAM LAPIDGE,	Perſons employed in the cultivation and cure.
HAYFORD BROWN,	
BARTLE HOG,	

The Gold Medal, being the Premium offered for improving Waſte Moors, was this year adjudged to Charles Hassall, of Eaſtwood, in Pembrokeſhire, Eſq. from whom the following Account and Certificates were received.

SIR,

I WILL thank you for laying the Papers accompanying this, before the Society for the Encouragement of Arts, Manufactures, and Commerce.

The method I have taken to ſtate the management of each field, has been practiſed by me ſome years, and has been found comprehenſive and uſeful in regiſtering paſt, and planning future, operations in farming.

Should the Society approve my endeavours to amend the practice of the plough in this remote corner of the kingdom, where the culture of green crops is almoſt in its infancy ; I ſhall think myſelf highly honoured by any mark of approbation they may think proper to confer.

I am, SIR,

Your moſt obedient ſervant,

CHARLES HASSELL.

Eaſtwood,
Jan. 15, 1793.

Mr. MORE.

An Account of the Average Expence of cultivating an Acre of Waſte Moor Land, in the poſſeſſion of Mr. Charles Haſſall, *taken at a medium of the whole Property, cultivated by him.*

	£.	s.	d.
Grubbing roots - - - -	1	1	0
Paring ant-hills, &c. - -	0	14	0
Gathering and burning - -	0	2	3
Spreading aſhes - - -	0	1	6
Gathering ſtones - - -	0	0	8
Carried over	£.1	19	5

Brought forward	£.1	19	5
Six carts of lime, four chaldrons, coſt - - - - -	1	1	0
Carriage of ditto - - - - -	0	9	0
Spreading lime - - - - -	0	1	2
One ploughing - - -	0	6	6
Total expence of cultivating one ſtatute acre - - -	£.3	17	1

The lands thus cultivated were, for the moſt part, overgrown with bruſh-wood, furze, and brambles. Some parts were grubbed for fourteen ſhillings a ſtatute acre; and others coſt twenty-five ſhillings: but the general average was about one guinea an acre, as ſtated above.

WE certify, that Mr. Charles Haſſall, of Eaſtwood, in the pariſh of Narbeth, in the county of Pembroke, hath cultivated, and improved, three hundred and thirty acres of Waſte Moor Land, ſituate in the ſame pariſh, and hath encloſed the ſame with good quick hedges, and divided it into fields ſufficient for the uſe and occupation of a tenant.

The ſaid land was lately, and before ſuch improvement, abſolutely uncultivated, and in a great meaſure uſeleſs. We have had frequent opportunities of obſerving the cultivation and improvement thereof; and we believe the mode of cultivation, and the expence attending the ſame, as laid down by Mr. Haſſall, in the foregoing account, and in his table, ſigned by us, to be true; and we think the land, ſo cultivated and improved, is worth, at this time, twelve ſhillings per acre.

The proportion of graſs to arable, is about one fourth of graſs, and three fourths arable. Mr. Haſſall intends laying about half the lands down in graſs ſeeds, and is preparing about ſeventy acres for water meadows, for which purpoſe the ſituation ſeems very favourable.

JOHN HERBERT FOLEY.
RICHARD FOLEY.

January 10, 1793.

IN conſequence of your letter, communicated to us by Mr. Haſſall, we take leave to inform you, that his certificate, relative to a ſcheme of cultivation, carried on at Eaſtwood, was ſigned by,

SIR,

Your humble ſervants,

J. H. FOLEY, of Ridgway, Pembrokeſhire.

RICHARD FOLEY, of Haverford-Weſt.

A

Shewing the Progreſs

Number and Soil.	*Fields Names.*	1789.
1. Strong Loam.	The Bath Field.	Grubbed, burned, ploughed, limed, ſown with Turneps. A very good crop.
2. Sandy Loam.	Middle Well Field.	Grubbed, burned, limed, and ſown Wheat. At one ploughing.
3. Sandy Loam.	Weſtern Well Field.	Ditto. I have tried one two and three ploug
4. Sandy Loam.	Lower Foot Way.	Grubbed, burned, and ſown with Oat Darnel.
5. Sandy Loam.	Upper Foot Way.	Ditto. Part of this Field is left uncul
6. Sandy Loam.	Woodbridge Field.	Ditto.
7. Mixed Loam.	Great Croft.	
8. Strong Loam.	Great Paddy Land.	

AN

AGRICULTUR

rogreſs of Cultivation upon Three Hundre

In the poſſeſſion of Mr. CHA

Diſtinguiſhing each Y

<table>
<tr><th>1789.</th><th>1790.</th><th>1791.</th></tr>
<tr><td>, ploughed, limed, and
th Turneps.
good crop.</td><td>Barley with Cow-Graſs and clean Hay ſeeds.
An excellent crop.</td><td>Mowed for Hay: turned
good crop</td></tr>
<tr><td>, limed, and ſown with
Wheat.
ploughing.</td><td>Wheat.
A fair crop.</td><td>Oats,
With red Clover and cl</td></tr>
<tr><td>Ditto.</td><td>Ditto.</td><td>Ditto.</td></tr>
<tr><td colspan="3">vo and three ploughings for Wheat in the courſe of this undertaking. The firſt crop, by thi
ridges. A light harrow drawn backwards and forwards ove</td></tr>
<tr><td>and ſown with Oats and
arnel.</td><td>Darnel.
A poor crop, foul and thin.</td><td>Summer fallowed, lime
ſown with W</td></tr>
<tr><td colspan="3">N. B. This proceſs was merely by way of trial, how the land would ar</td></tr>
<tr><td>Ditto.</td><td>Ditto.</td><td>Ditto.</td></tr>
<tr><td colspan="3">Field is left uncultivated (in Bruſhwood) for the purpoſe of affording ſummer ſhade to mare</td></tr>
<tr><td>itto.</td><td>Darnel.
A moderate crop.</td><td>Ploughed in the</td></tr>
<tr><td></td><td>Grubbed, burned, limed, and ſown with Wheat.</td><td>Wheat.
A good cr</td></tr>
<tr><td></td><td>Ditto.</td><td>Ditto.</td></tr>
</table>

AN

URAL TABLE,

Hundred and Thirty Acres of NARBE

Mr. CHARLES HASSALL ;

hing each Year's Crop.

<table>
<tr><th>1791.</th><th>1792.</th><th></th></tr>
<tr><td>d for Hay: turned out a very clean good crop.</td><td>Cow paſture.</td><td></td></tr>
<tr><td>Oats,
red Clover and clean Hay ſeeds.</td><td>Mowed for Hay.</td><td></td></tr>
<tr><td>Ditto.</td><td>Ditto.</td><td></td></tr>
<tr><td colspan="3">firſt crop, by this method of culture, has always ſucceeded beſt with one ploughing only: ls and forwards over the ridges, and the reans cleared with a Norfolk foot plough, finiſhes the</td></tr>
<tr><td>er fallowed, limed, mucked, and ſown with Wheat.</td><td>Wheat.
A fair crop.</td><td>Oats, with</td></tr>
<tr><td colspan="3">the land would anſwer without lime for the firſt crops. I find lime upon theſe ſoils abſolute</td></tr>
<tr><td>Ditto.</td><td>Ditto.</td><td></td></tr>
<tr><td colspan="3">mer ſhade to mares and colts. This and No. 4, being frontier Lands, at a diſtance from th</td></tr>
<tr><td>Ploughed in the Autumn.</td><td>Limed, mucked, and ſown with Turneps.</td><td>With a mixt
Mar</td></tr>
<tr><td>Wheat.
A good crop.</td><td>Oats,
With red Clover and Darnel.</td><td></td></tr>
<tr><td>Ditto.</td><td>Oats,
With Cow-graſs, Trefoil, and Darnel.
(In part the Trefoil omitted.)</td><td></td></tr>
</table>

L E,

NARBETH WASTES,

	1793.	*Intended Proceſs in* 1794.
	Paſture.	Paſture.
	Grazed.	Oats, intended for Turneps next year.
	Ditto.	Ditto.
e ploughing only: the ſeed ſown upon the manure and ploughed under furrow, in five bout lough, finiſhes the work very neatly.		
	Oats, with Dutch Clover, Trefoil, and Darnel.	Mown.
theſe ſoils abſolutely neceſſary (we have no marle).		
	Ditto.	Ditto.
a diſtance from the Farm Yard, are intended to lie in graſs for breeding grounds.		
ur-	Barley, With a mixture of Dutch white Clover, Marl Graſs, and Darnel.	Intended to remain in Graſs for Meadow. Lies well for watering.
	Grazed.	Summer fallowed for Wheat.
nel.	Mown.	To be kept as a watered Meadow.

7. Mixed Loam.	Great Croft.	
8. Strong Loam.	Great Paddy Land.	
9. Mixed redLoam.	Jeffries Leys.	
10. Mixed redLoam.	Eaſtwood Lawn.	
11. Strong Loam.	Lower Paddy Land.	
12. Strong Loam.	Ox Field.	
13. Strong Loam.	Grove Eaſt Leys, and Grove Weſt Leys.	
14. Light redLoam.	Broadway Field.	
15. Light redLoam.	Mill Lot in Two Fields.	
16. Mixed Loam.	Protheroes Leys.	
17. Light Loam.	Part of Molleſton Lot.	

The proceſs of burning was thus performed: After the roots and
ſun-ſhine rendered them fit for burning, which being finiſhed, the lime
the ſeaſons (latterly unuſually wet) have influenced me much. So far as ex

	Grubbed, burned, limed, and ſown with Wheat.	Wheat. A good cr
	Ditto.	Ditto.
	Grubbed, burned, limed, and ſown with Turneps. A famous crop.	Barley, with red
	Grubbed, burned, limed, and ſown with Wheat.	Wheat.
		Grubbed, burned, limed Turneps A very fine c
		Grubbed, burned, lime Wheat.
		Ditto.

About Ninety Acres of Waſte remains uncultivated, which will furniſh Tu

the roots and other traſh were thrown into heaps, and ſufficiently drie
iſhed, the lime was laid upon the land, in ſmall heaps; and when the ſ
h. So far as experience fixed my opinion hitherto, the proceſs of No. 9 cl

Wheat. A good crop.	Oats, With red Clover and Darnel.	
Ditto.	Oats, With Cow-graſs, Trefoil, and Darnel. (In part the Trefoil omitted.)	
Barley, with red Clover.	Clover. Mown and ploughed in the Autumn. (part ſown with Wheat.)	Part ſown wi The W
Wheat.	Winter fallowed, mucked, and ſown with Turneps. A good crop.	With Cow
ɔed, burned, limed, and ſown with Turneps. A very fine crop.	Barley with red Clover and Darnel.	Plou
bed, burned, limed, and ſown with Wheat.	Wheat. A very fine crop. Ploughed in Autumn.	Part Turnep N.
Ditto.	Ditto.	V
	Grubbed, burned, limed, and ſown with Wheat.	
	Ditto.	Loc
	Grubbed, burned, limed, and left fallow during Winter, being much grown with Fern.	
		Grubbed an

ich will furniſh Turnep Lands for theſe Two Years: it is now in progreſ.

fficiently dried, the ant-hillocks, moſs, &c. were flead off with a ſtrong
nd when the ſeaſon for ſowing arrived, the whole was ſpread with ſhove
ɔſs of No. 9 claims a preference.

	Grazed.	Summer fallowed for Wheat.
nel.	Mown.	To be kept as a watered Meadow.
n.	Part ſown with Barley and mixed Graſs Seeds, The Wheat looks promiſing.	Ditto.
ith	Barley, With Cow Graſs, white Clover, and Darnel.	To lie for Meadow, is watered by a good ſtream brought through the Stable yard.
l.	Mown. Ploughed in the Autumn.	Barley, with mixed Graſs Seeds, to lie for watered Meadow.
	Part Turneps, part Rape, for Spring feed next year. N. B. To be mucked.	Barley, With red Clover,
	Oats, Winter ploughed.	Mucked, and ſown with Barley and mixed Graſs Seeds; to lie for watered Meadow.
ith	Wheat.	Winter Vetches,
	Wheat. Looks very promiſing.	Stubble ploughed laſt Autumn, and ſown with Rape for Spring feed this year. Barley to follow the Rape.
ow wn	Barley, With red Clover.	Clover.
	Grubbed and prepared for Wheat in the Autumn.	

with a ſtrong hoe or mattock, and thrown upon the heaps; a few days
ad with ſhovels, and the ploughing commenced. In my choice of crops,

Signed { JOHN HERBERT FOLEY.
RICHARD FOLEY.

TWENTY GUINEAS, being the pecuniary Premium offered for an improved Hoe, was this year adjudged to Mr. JAMES M'DOUGAL, of Great Windmill-ſtreet, Haymarket; the Hoe, ſent by him, being found on trial to be ſimple in its conſtruction, and to anſwer the purpoſe of a hoe, to be worked by men, in a manner ſuperior to any hitherto known to the Society, for clearing from weeds, and looſening the ſoil, in the intermediate ſpaces of pulſe or grain, ſown in equidiſtant rows, and for earthing up the plants ſufficiently at the ſame time.

A PRINT of this Hoe, ſhewing the conſtruction of it, and the manner of uſing it, is prefixed as a frontiſpiece to this Volume; by which it is evident, that the Hoe conſiſts of two principal parts; the firſt, a beam of wood, having, at its fore end, a ſemi-circle, forming two handles, between which one man walks and draws the inſtrument forwards; this beam, at the other end, is divided, and moves on two ſmall gudgeons, by which it is accommodated to the height of the hands of the perſon drawing, and room allowed for a wheel to move in.

The other beam is held at its further end by another man, who guides the inſtrument, and regulates its depth in the ground, at the ſame that he aſſiſts its action by thruſting it forward. This beam is alſo divided at its fore end, ſo as to admit a wheel to run between the ſides, which wheel ſerves to adjuſt the depth, and eaſe the draught in working.

The Hoes (properly ſo called) are made of caſt-iron, and fixed in a mortice, in the hinder beam, by a proper wedge, and may be of different forms or dimenſions, as the work to be performed requires.

THIS is to certify, that we, the underſigned perſons, have ſeen Mr. James M'Dougale's Hoe tried on our ſeveral ſoils, and that it is much more expeditious and effective than any method hitherto practiſed by the hand, for the purpoſes of clearing from weeds, and looſening the ſoil, in the intermediate ſpaces of all crops of corn, ſown in equidiſtant rows; and alſo earths up the young plants at the ſame time: it is alſo made to go deeper occaſionally, by putting the wedge behind the hoe.

William Malcolm.
James Malcolm.
James Fairbairn, Clapham.
John Glenny, Batterſea.

SIR,

WITH reſpect to Mr. M'Dougale's hoeing machine, I was preſent at ſeveral experiments made, in my grounds, againſt our common hoes: I think it much exceeds either the common hoe, or any other hoes that I have ſeen; and as far as a machine of this kind can be applied in hoeing, is infinitely the beſt; in point of cutting the ground, the trueſt, and in the moſt expeditious way.

I am, SIR,

Your moſt humble ſervant,

WILLIAM MALCOLM.

Stockwell Nurſery,
Dec. 17, 1792.

SIR,

I FEEL no difficulty in declaring that, in moſt caſes, where annual crops are ſown, the common hoe, or any other that I have ever ſeen, bears no ſort of compariſon, as to expedition and the effectual manner of its operation, with Mr. M'Dougale's.

I am, SIR,

Your very obliged humble ſervant,

JAMES MALCOLM.

Stockwell Place,
Dec. 17, 1792.

Thanks were returned to Mr. Henry Browne, of Derby, for the following communication, relative to the preſerving Seeds from being deſtroyed (when ſown) by Vermin. And it will be highly ſatisfactory to the Society to receive accounts of the ſucceſs of the method hereafter preſcribed, from any perſons who may be induced to make a trial of it.

SIR,

Looking over ſome old publications of the Society for the Encouragement of Arts, Manufactures, and Commerce, I find an article relating to the preſervation of grain or ſeed from being deſtroyed by vermin: not knowing whether you have ever had a preſervative communicated to you, I think it my duty to lay before you a very ſimple method I have made uſe of for the three laſt years; in which time I have never loſt a ſeed by vermin, although they have burrowed, in a direct line with almoſt every row of peas and beans that have been ſowed. It is nothing more than ſteeping the grain, or ſeed, three or four hours, or a ſufficient time for it to penetrate the ſkin, or huſk, in a ſtrong ſolution of liver of ſulphur. If the above communication is worth notice, and turns out to the leaſt advantage to the community, I ſhall be happy;

And am, SIR,

Your very humble ſervant,

H. BROWNE.

Derby,
March 31, 1793.